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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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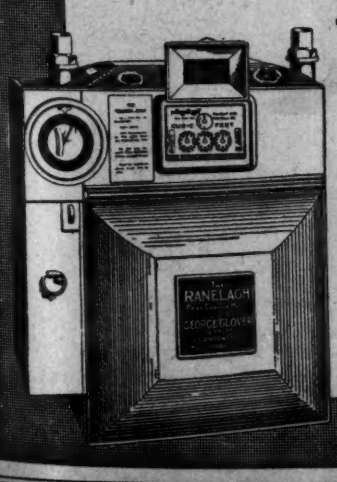

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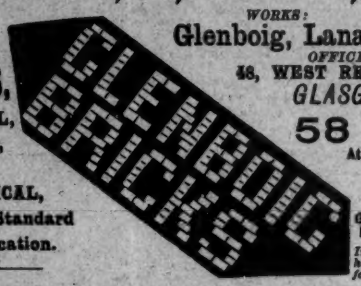

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VOL. CLXVIII., No. 3206.] WEDNESDAY, OCTOBER 22, 1924. [76TH YEAR.

EDITORIAL NOTES.

The Path which Led to Greater Freedom—Some Criticism.

DURING the last twenty-one years, there have been momentous happenings in the gas industry. It has been a period of concentrated progress along a well-defined path; and it has activated the vitality of the industry in a remarkable degree. In delivering an address to the Scottish Junior Association last Saturday, Mr. W. R. Herring, M.Inst.C.E., came once more on to the stage provided by our institutions, and with that clarity of expression of which throughout his professional career he has shown the possession, he related step by step the evolution of statutory requirement which has released the industry from old fetters, and has given to it a freedom which is of incalculable advantage to both it and the consumers of gas. It is well that the juniors of the industry should have the story of the changes in testing conditions placed before them in condensed form, and by one who in years of long ago and more immediate ones took a prominent part in the controversies which brought about certain of the developments which have issued in what we believe to be conditions which are finally settled, and which give justice to all concerned. We can look from the beginning, through intimate following in committee rooms and elsewhere, upon the changes referred to, and can in memory live again through the searching investigations, and the keen discussions, with sometimes an amount of acerbity in them. We remember, too, that of the men who took prominent part in those earlier fights (which eventuated in the revolution brought about by the Gas Regulation Act) few remain. There are Dr. Carpenter, Mr. H. E. Jones, Mr. Charles Hunt, Mr. W. J. A. Butterfield, and Mr. Herring. Others who were in the front in the earlier fights have passed away. They have not lived to see the full issues of the path which they helped to pave, and along which they assisted, in one way or another, to carry the gas industry. However, other than for the interest, and to show the contributory steps to the present statutory quality and testing enactments for the information of those who are unacquainted with the facts so fairly put by Mr. Herring, there is no practical value to-day in their narrative; and there is no need to pass comment on the history of those things which refer to standard burners and tests for illuminating power, the incoming of calorific value as a standard, and finally the passing of the Gas Regulation Act with all its invitation to the industry to develop itself and its service. There are other matters in the address which claim consideration.

To the conditions arising out of the war, Mr. Herring rightly ascribes the hastening of the pace which has conferred such lasting benefit upon gas consumer and manufacturer. There is no doubt, too, that the war enabled the industry and those concerned in its regulation to see many things, apart from selling B.Th.U., in a new light; and this is to the advantage of the public. For example, Parliament passed the Statutory Undertakings (Increase of Charges) Act, 1918, which gave some, if thin, relief in the years of abnormal stress to those interested in the ordinary capital stocks of gas undertakings. That Act is now extinct. But what Parliament then did, that Parliament can do again. But it will be hardly necessary, inasmuch as the Gas Regulation Act provides the way for application being made to the Board of Trade for variations of standard price, should altered conditions justify. This indicates that Parliament now realizes the importance of a fair amount of capital stability in such an industry as ours. Mr. Herring makes an important point in this connection. It is to the effect that, if a company is protected so that it can raise revenue sufficient to enable it to pay some dividend upon its ordinary stock, it automatically enacts the provision of sufficient revenue to pay interest on all other prior charge stocks, so that the loan and preference stocks of a gas company to-day are equal to "gilt-edged" securities. It is considered by Mr. Herring that this should enable gas undertakings to be financed on a lower scale of interest than has recently been the case by employing a larger proportion of loan stock in relation to the ordinary capital. This would be of considerable advantage to gas companies; but, of course, they are limited in the proportion of borrowed money to issued and paid-up ordinary capital which they are permitted to raise, though there is the additional liberty in respect of preference stock. It is thought by Mr. Herring that if investors were informed as to these facts, it would influence them to take up loan and preference capital. But unfortunately these are days of high costs of living and weighty income-tax; and investors therefore are not content with a low return upon their money. The very protection which gilds gas loan and preference stocks should make more attractive the ordinary capital, seeing that upon it a dividend is assured even in the event of adverse circumstances, which would warrant a change in standard prices, and normally the dividend will be higher than the interest on the loan or the dividend on the preference stocks.

Passing over other points in the address, we come to one which also bears upon a question of finance, as well as upon administration. Mr. Herring points out that the Gas Regulation Act stereotypes the condition prevailing in the pre-war years, and builds upon it increased charges of every possible description. "It has no regard to the structural "conditions of one undertaking operating with the most "modern plant, and another that is still carrying on with "the mediæval practices that are better suited to an anti-"quarian's mind than to an up-to-date process operation." But has any gas legislation ever made such a distinction? If so, we are not aware of it, other than through the sliding-scale, which is still in operation, but the fundamental principle of which Mr. Herring thinks has been destroyed by the Act, and so has removed that zest for improvements and economy which it was intended to foster. This is all somewhat vague; and it would be of interest to have a plain understanding of what is in the mind of our friend. He is manifestly opposed to good and bad management being both treated alike. But are they? Fundamentally they are; but the effect of their doings must be reflected in the dividend they are able to pay above the standard rate. The train of thoughts carries Mr. Herring on to say: "Appa-"rently those who can claim improvements in the method "of manufacture since the pre-war year, are claiming also "to justify a higher standard price in consequence of im-"provements which they had neglected to introduce in the "pre-war period." Now is that a fair charge for universal application? A whole decade has passed since pre-war times; and during the greater part of that period gas managements could not make improvements in their plant. This in the main was not due to neglect, but to compliance with decrees against which there was no alternative. Much plant did not need improvement before the war; but it did after the strain to which it was exposed in succeeding years through no fault of the managements. Again, Mr. Herring himself admits that the war gave much enlightenment as to the way to economical improvement of gas-works processes. Before that enlightenment, and until it was opportune, the new knowledge could not be applied. Even Mr. Herring

has no doubt learnt something through the war which, owing to the lack of knowledge, he would not have applied in 1914. But that cannot be described as neglect.

However, in his view the only effective way of forcing improvements and economy in any complicated manufacturing process not subject to the ordinary law of competition, is to make it difficult with old-fashioned plant to earn the profits necessary to pay the dividends on the capital involved. It would be of no small interest to have from Mr. Herring a definition of the conditions which he would himself apply in order to bring about this salutary change. Apparently, he would adopt a standard of thermal production for different classes of coal and different types of carbonizing plant, and in some way or other punish those who did not reach that standard. Whatever the line taken, it would introduce another complication, which the Board of Trade and Parliament might not relish, but which would undoubtedly give considerable scope to controversy, and once again gas consultants would have their activities largely increased, with commensurate reward for the work. It would be like those old times when consideration was being given to the substitution of the No. 1 "London" argand by the Carpenter (London No. 2) standard, or when the Gas Light and Coke, South Suburban, and Wandsworth Companies stepped from the illuminating power standard to a calorific value one. We admit that there are old-fashioned, uneconomical concerns which ought to have new and progressive administrations; but it is not a simple matter to deal with them by a formula which might injure some who are not doing well, and yet whom it would be unjust to punish. Where there is proved negligence, it is the cause that should be removed, and the cause would be the administration. That would be better than introducing fresh statutory complexity. However, these are a few among many points in an address from Mr. Herring, which very much reminds us of old times.

Preparation and Problems.

THERE are great problems confronting the gas industry, which sooner or later will have to be dealt with. They are already under general consideration; and, with their development, definite action will have to be taken. Their nature was sketched in the address which Mr. R. E. Gibson, Engineer of the Liverpool Gas Company, delivered to the Yorkshire Junior Gas Association last Saturday. That address should have very careful attention not only from the junior members of the gas profession, but from the seniors. We are hearing just now a good deal about the leaders of the three political parties having in their General Election manifestos given a good "platform" to their followers who are seeking the suffrages of the country. Mr. Gibson has given a good "platform" to, or lead in, matters which should have very earnest consideration at all technical meetings of gas men during the next six months. It would be folly to try to evade the problems and their issues. They are here as questions of policy, and in some respects are not publicly attached (as they should be) to the gas industry, which some people would like to see by-passed in regard to them. But the industry must see that its claims are recognized, and that there is proper identification of it with all subjects that deeply concern its future, and its capacity for serving the nation. The industry is to-day, in its service, a real national institution, and nothing can displace it from its position, but misdirected policy may injure its ability to render the fullest service of which it is capable.

To consider the points in the order mentioned. In the first place, the internal problems of the industry alone are, or should be, sufficient to induce everyone in authority in the industry to advance as far as possible all schemes which will provide the qualified men for the larger responsibilities which with clear certainty are coming. But adding to those internal problems the wider and more general ones to which Mr. Gibson refers, and the manner of dealing with which may hasten or retard the progress of the industry's interests, accentuates the need for the equipment in a very complete sense of the future chief officials of the industry. There is emphatic recognition of this on Mr. Gibson's part. "If the gas industry," he says, "is to maintain its proper "place as a great public service, it will need men of char- "acter and ability, and men equipped with the necessary "knowledge, and capable of applying that knowledge to the "best advantage possible." And looking to the problems to which he later drew attention, they will have to be men of vision and diplomatists. In view of all this, we are not disposed to agree with those who think that the lines of the Institution Education Scheme have been pitched too high. The specification must always be equal to requirement—nothing less will suffice; and we see no reason why brains and capacity cannot be tuned-up to the present and prospective requirements of the industry, and the schemes and examinations be related to those requirements. From what we know of many of our young men in the industry, they would dissent from any suggestion that their mental capacity is not equal to being tutored up. That is the view to be encouraged—not the idea that the standard is beyond the need. Mr. Gibson does not say that it is; but there is a tendency in his observations to favour the submission of some gas men that it would have been better to arrive at the present standard by at first instituting an intermediate step. In our opinion, it is better at once to show what is essential, and not permit—this would be unfair—of some realizing what will be coveted certification and the higher distinction of a diploma by any easier method than those who will succeed them in the effort to realize the same honours. In this connection a suggestion in the address is worthy of further consideration; and it is that the new Education Scheme should, in some way or other, be linked-up or co-ordinated with the degree course in gas engineering at the Leeds University.

The character of the service of the gas industry is of vast importance to our urban communities individually and collectively; and therefore it is a national service. The broad and highest view of it was urged by Mr. Gibson; the place of the industry both in war and peace time justifies the men of the industry regarding its work in that light. But there is a tendency to forget and to overlook; and this is more marked when one considers the attitude of the "powers that be" in relation to certain problems that are really of national importance, but which are not being dealt with wholly and nationally. They are being dealt with merely in part—to form an item in political programmes—because short-sighted politicians will not fashion a policy, though it has tremendous national significance. The mere mention of these problems shows the vast responsibility which rests upon gas men of to-day and more so of the future, whichever be the direction in which settlement (we cannot say solution) is found. Fuel economy and the securing, so far as is practicable, of the complete wealth from coal instead of only its heating property, is one of the greatest pieces of enterprise in which a government could indulge in respect of domestic economy; but they narrow down their opportunities to the one consideration of electricity generation and transmission, which is not attacking the problem on lines to realize the maximum result. The promoters of these schemes, as well as the Government, have (we read in the address) "apparently closed their eyes to the claims of the gas industry, without whose help fuel economy to the greatest possible extent cannot be attained;" and "our industry is treated more or less with indifference." This is to be regretted; but we should not mind this so much if it were not for the suggestion that electricity should be subsidized, instead of having to stand (as gas does) upon its own financial feet. We have sufficient faith that, if electricity is not given any undue and uncalled-for advantage, the gas industry will perforce, through its inherent merits and work, drive its own way to the top in this matter of coal conservation, owing to the better use it makes of the chief of raw materials. Mr. Gibson is of an optimistic nature; but in this regard he is of opinion that until the "powers that be"—in other words, the Government—recognize the supreme importance of the work the gas industry is doing, and has been doing for a long time, "there is no hope of advancement on right lines." But there is little doubt in his mind that "sooner or later co-operation will have to take place between gas and electricity undertakings. Such co-operation will be necessary in the interests of coal economy." These words can only have one interpretation—that the Government will in time be forced by the facts to a realization of the truth of the matter. Truth must prevail. What is wanted is a complete survey of the position of the gas industry in the land, of its utilization of coal, and of the derivatives which it places at the disposal of the country. That is the work which must be forced upon the attention of the Government; and there will be conviction in the result. The scope for the prevention of waste is tremendous; the prevention of waste is money saved, and a strengthener of our position as a nation. "Out of a total output per annum of 276 million tons of coal, only 30 million tons, or 12 p.ct., is distilled for the production of

gaseous and solid smokeless fuel and various bye-products." There we have the starting-point into a vast field of opportunity and potentiality. But whatever the difficulties, whatever the propensity of the Government, Mr. Gibson is sufficiently an optimist to believe that they can and will be overcome. That is the right spirit; but there must be immediately strong resistance to any preferential subsidizing.

There are the many internal problems of the industry—the future system or systems of producing gas, the efficiency of the subsidiary processes, competitive charges for gas, a proper understanding of the relative properties of gas and electricity for the several applicable purposes, and the changes of policy necessary in the gas industry with the view to establishing its interests still more firmly. We are glad to see that Mr. Gibson regards the systematic inspection and maintenance of consumers' appliances and fittings as of supreme importance. This policy, he believes, will demand greater attention from the whole industry in the near future; and he commends it as a subject worthy of special study and consideration during the current session. The sooner the better. Regarding this particular extension of work, many minds are exploring its problems to-day; and there is the hope that further developments will soon be made. To what does all this point? That in the qualifications of its men the industry must advance in order to meet changes of conditions, some close upon us, others yet unknown.

Art in Industry.

THIS is a utilitarian rather than a dilettante age; and yet we all like beauty, want beauty, and must have it. Just as the highest utility in works and appliances is an advantage to the gas industry, so beauty in the devices by which gas is used has a substantial value in contributing to popularity, and popularity is something to be courted by any and every legitimate means in the work of a public utility industry. It is an asset of profit-producing, progressive, and stabilizing importance. Thus we must have as far as is practicable the combination of beauty and utility. In the address which Sir Lawrence Weaver, K.B.E., delivered at the meeting of the "B.C.G.A." on the "Influence of Beauty in Commerce and Industry"—an address eloquent, full of thought, and persuasive—he showed the potential value of beauty in our trading and work. We are in perfect agreement with him; but care must be exercised that we do not allow the idea of beauty in some of our appliances to take precedence of their main purpose—to render service. Every separate type of appliance must be considered, and a proper balance be kept between desirable efficiency and attractive appearance.

Sir Lawrence takes us to a very high level by his ideals; and in such matters as this we always prefer to have ideals placed high, because it incites to greater effort to attain. His ambition—and it is a great ambition—is to get beauty into all the relations of life, and into all common things. To make beautiful the means by which service is rendered is, he says, an infinite power of industry. That is true in all that is feasible, and especially in those goods—such as gas fittings and appliances—which are in general demand and use, because what is done in the way of beautifying them has a universal expression and is universally seen. There is no question that in everyday life our surroundings have a large psychological effect, and beauty—like cleanliness—is a material producer of such effect, and of the very best order. Therefore, it is to our interest to cultivate beauty in our gas-using appliances, so long as it is not subversive of utility, and therefore of economy and efficiency, which to-day are of marked importance to the people, with the buying power of money so much below what it was ten years ago, and taxation at the level at which it is. These two facts have unquestionably had a blighting influence on the patronage of art, and of a greater application of it to manufactured productions. It has been necessary to pare here and there in order to keep costs as low as possible, so that the people may have the advantage of the highest economy in service. Fortunately in the gas industry the agents by and through which our primary commodity is applied to the service of mankind are such that it has been possible to advance, instead of having a set-back, in their artistic and prepossessing forms, without sacrificing utility, but at the same time increasing it.

Sir Lawrence Weaver made handsome acknowledgment of this, as he did of the artistic effects of the Gas Exhibit at Wembley. These are his words: "I say, not as flattery, "but as very simple truth, that the only really entirely satisfactory piece of commercial publicity at Wembley is the "Gas Exhibit, because it is the only piece of publicity which "has entirely suppressed the individual, and has gone out "simply to make a fair and beautiful and praiseworthy "picture of an industry." Later, too, he referred to it as "an extraordinarily attractive picture"—adding "that is "beauty associated with commerce in service; and it is really "the convincing art in advertising." Speaking of the rooms in the exhibit, he also remarked that "they had been laid out so that they convey to the public mind, through the real beauty and seemliness of them, the idea that gas is a pleasing thing." The address vibrates with the feelings and thoughts of one who loves beauty in all things; one who appeals for it to those who can impart it. When approving testimony comes in such generous terms from such a one, it has great meaning, and is of immense value. The Exhibit has satisfied him that gas is a fit aspirant to service in the most chaste surroundings, and that fittings and appliances whereby it is used can be obtained that have merit which can gratify even hypercritical artistic taste. Not all gas fittings and appliances are of that order; but it is well that the best should be demonstrated. It is easy enough to descend from high standards to lower; and, in respect of gas fittings and appliances, there is less necessity to demonstrate the latter to the public. The years that have passed have done that all too well; how in the matter of advance we stand in 1924 is what has now to be demonstrated. That has been done at Wembley; and to the gas industry Sir Lawrence Weaver—excellent judge and critic—awards the palm for imagination and artistic merit in display.

Not only are gas fittings and appliances available which command for their beauty as well as utility, but, where gas is employed for heating purposes, it has the valuable advantage that it assists in the protection of the fine architectural beauty found in our cherished historic buildings and in the work of the modern architect who introduces art into his designs in a manner that pleases without adding greatly to the structural outlay. We are constantly hearing of the cost of renovations that are needed through the erosion of stonework due to the offensive and destructive emanations of chimneys from fires and furnaces in which raw coal is used; and, owing to the same cause, we see our public and other buildings hideously begrimed by smoke. Gas is working slowly but surely in the removal of the cause of such disastrous effects; and this, too, is a matter which should please those who, like Sir Lawrence, are lovers of the beautiful.

One other thing. Sir Lawrence spoke of the "devastating blast of ugliness" which industrial development has laid on the land. We are not going to claim that gas-works buildings are things of beauty; some of them are better than others, some of them are made to look more attractive by pretty horticultural surroundings. But while we believe that heavy, dull, and drab works need not be erected—that a very little additional expenditure would make a considerable difference to the outward and visible erections—Sir Lawrence and those who think and desire with him can forgive gas-works much when they consider their service in supplying in our urban areas an agent which saves labour, makes life easier and more beautiful, and helps to purify the atmosphere and to preserve the beautiful in architectural construction. But there is one thing that Sir Lawrence should remember. It is that all men do not regard art from one point of view. There are engineers who look upon our big gasholders, and our large coal and coke conveying plants, as works of art. They can stand and admire them, and find much pleasure in doing so. But though there are different points of view in these matters, we are all agreed that beauty is preferable to ugliness. Then let us have it wherever possible without affecting those other things for which the world craves, and about which it is talking more than ever—economy and efficiency.

Gas Salesmen's Day at Wembley.

Our report of the proceedings at the annual conference of the Gas Salesmen's Circles appears in "THE GAS SALESMAN" which is issued as a supplement to this "JOURNAL." The publication has been made a week earlier than usual in the month, in order to place the report before our readers as early as possible.

Only a Few Days More.

The date fixed for the closing of the British Empire Exhibition is Nov. 1. Those who have not yet been, or wish to pay

another visit, have only nine days more in which to repair the omission or to gratify a very proper desire.

Coal, Electricity, and Politics.

The General Election has more than ordinary interest for the gas industry. If the Liberals are put in a majority, they propose to empower the State to acquire all mineral rights, and to provide State assistance and direction in the building of electric super-power stations. If the Socialists are returned, they contemplate the re-organization of the whole mining industry (in conjunction with bye-products and power stations) on the lines of national ownership. As to the conversion of generating stations as a national system, they state that the primary object is to provide cheap power for industry—instead of profit for shareholders—and cheap and convenient light for householders everywhere. We think the country will prefer practical men in power, and not mere visionaries and idealists.

A Little More Convected Heat.

The references made in last week's "JOURNAL" to the views of Mr. Arthur Barker, B.Sc., B.A., on the improvement of the gas fire have drawn some correspondence this week, on the subject of increasing the proportion of convected heat. In connection with those letters, we recall the article by "Lemaro" on "An Advance in Gas-Fire Construction," which appeared in our issue for Oct. 21, 1919 (p. 126). A good many gas men believe that it would be to the interest of the gas industry if manufacturers would pay more attention to the provision of a greater amount of convected heat from gas-fires than is now done with the majority of the types. One prominent gas man tells us that he is confirmed in this opinion by four years' experience with upwards of 1000 gas-fires of the type suggested, which have been fitted and have given great satisfaction in all classes of dwelling-houses.

Murdoch's House and Gasholder.

It will be remembered that Mr. P. C. Holmes Hunt (when last home from Australia) urged that the gas industry should take steps to preserve the house where Murdoch lived when occupied with his epoch-making inventions in connection with the gas industry. There is also the first gasholder which was used by him, and which is standing at the works of Messrs. Avery, Ltd., at Smethwick. A small Committee of the National Gas Council, the Institution of Gas Engineers, and the Society of British Gas Industries are going to consider the matter. It will not be to the honour of the industry if it allows the destruction of such mementoes of the work which led to its foundation. The industry has not done much for Murdoch who did so much for it.

Sulphate of Ammonia Prices.

It is noticed that the British Sulphate of Ammonia Federation, Ltd., are continuing their policy of slightly advancing their prices month by month. For November delivery, the price has been fixed at £14 6s. per ton; and for December delivery, at 2s. more. These figures are for neutral quality, 21·1 p.ct. nitrogen. The prices are still about 20 p.ct. under the parity of the retail prices for nitrate of soda.

Mains in Public Roads.

It will be seen by an item in the minutes of the National Gas Council in a later column that, at the instance of the County Councils Association, there is likely to be a conference between them and representatives of authorities having statutory rights to lay mains, pipes, and cables beneath highways. The object is to see whether it is possible to formulate an agreed clause. The National Gas Council have appointed a small Committee to have a preliminary discussion with the other interests concerned.

Smoke Abatement Conference.

A great deal of interest is being taken in the smoke abatement exhibition and conference to be held in Manchester from Tuesday, Nov. 4. It is expected that there will be a good display of gas and electrical appliances; and papers will be read on various aspects of the smoke abatement problem. Among the subjects to be discussed will be low-temperature carbonization, smokeless fuels, and the complete gasification of coal. An afternoon session on the Thursday will be devoted to gas; two of the readers of papers being Sir Arthur Duckham and Mr. F. W. Goodenough. At an early evening session, electricity will take the platform. Later the same day a lecture will be delivered by Ex-Bailie W. B. Smith, of Glasgow, on "The Cost of a Smoky Atmosphere." This looks like a very attractive occasion. The National Gas Council will be represented at the conference by Mr. G. S. Frith, Mr. R. E. Gibson, Mr. F. Pye, Mr. W. J. Smith, and Mr. Samuel Tagg.

Geysers and Hot Water Apparatus.

A model specification has been prepared by the Committee appointed by the Ministry of Health to consider and advise on questions referring to water-supply pipes and fittings. One section deals with geysers and other hot water apparatus. This is reproduced in our "Miscellaneous News."

Electricians' Wage Claim.

We are not surprised to learn that the Special Tribunal of the National Joint Industrial Council for the Electricity Supply Industry have decided against the workers' demand for an increase of 10s. per week. The case they presented was weak—for the most part being simply a string of unsubstantiated contradictions of the employers' data and assertions. The Tribunal are of opinion that "the increased level of wages above that of 1914 is in excess of the increased cost of living; that the level of wages in the industry as compared with the wages paid in the principal industries using electrical power is higher than the average, and generally the conditions of employment are more secure; and that the industry is growing rapidly and, generally speaking, has become increasingly prosperous in the past year." In their opinion, no case has been made out for granting an increase. There is, however, a recommendation that the regional councils should be asked to reconsider their existing rates of pay, having regard to the prosperity of the industry in the area and to the special reductions which were effected in 1922 or 1923, and that attention should be given by the councils to those districts in which there appear to be grades of employees whose rates, due to the circumstances existing at the time when they were fixed in 1921, materially differ from the rates of corresponding grades in other areas. Pending the decisions of the respective regional councils, and the confirmation thereof by the National Joint Industrial Council, the operation of the sliding-scale, it is proposed, should be suspended. It is also suggested that the suspension of the operation of the notice issued by the National Council on July 19 should continue.

Iron and Steel Trade.

There is great depression in the iron and steel trade. Within a month three iron-works in the Tees district have shut-down furnaces. It is estimated that the number of furnaces in blast on the north-east coast is less than the normal by 43 p.ct. Wales is in no better condition. From the coal-shipping ports, anything but cheerful reports come as to the conditions of employment owing to the serious position of the export coal trade.

PERSONAL.

Mr. W. CULLEN MORRIS, Assistant Chief Engineer and Engineer of Construction of the Consolidated Gas Company of New York, is on a short visit to this country, before proceeding to the Continent.

Mr. WALTER DUNN, M.I.Mech.E., Secretary of the Institution of Gas Engineers, has been nominated for re-election on the Council of the Chartered Institute of Secretaries, the ballot papers for which have to be in before Thursday, Oct. 30.

Mr. GEORGE WALMSLEY, a native of Ilkley, and trained at the Ilkley Gas-Works under Mr. W. Everitt (the present Engineer), subsequently Assistant Manager at Cleethorpes, and latterly Assistant to Mr. R. J. Skinner, the Manager of the City of Londonderry Gas-Works, has now been appointed Manager there on the resignation of Mr. Skinner.

The Dundee Town Council, at a meeting on Monday evening of last week, appointed Mr. JAMES DICKSON, of Johnstone, to succeed Mr. Alexander Yuill as their Gas Engineer and Manager. By a majority vote, the Gas Committee had recommended the appointment of Mr. William Wilson, of Burton-upon-Trent. Mr. Dickson, who is at present Gas Engineer and Manager at Johnstone, had had experience at Broughty Ferry, Kelty, Forfar, and Dunfermline, before he went there eleven years ago. During his term of office in Johnstone, he has practically reconstructed the works, including tar distillation and benzole recovery plant, &c. When he went to Johnstone the works there were not equal to meet a demand for 90 million c.ft., but 200 million c.ft. could now be provided.

ELECTRICITY SUPPLY MEMORANDA.

SEEING that several gas undertakings—company and municipal—are considering the problem of the combination of gas and electricity supplies, Mr. A. J. Bond, the Gas Engineer of the Port Talbot Corporation, is of opinion that what is being done in that direction by his Council will be of interest to readers of the "JOURNAL." He is not mistaken; and we welcome from him the article in later columns. What is being done in this respect in various parts of the country is highly and nationally important. It is the thin end of the wedge in unifying the use of coal for the supplies of light, heat, and power, and in conserving its valuable properties. It is a fascinating development—at any rate, we find it so; and there is no knowing to-day what we may progressively come to in this regard. Mr. Bond is satisfied as to the enormous possibilities of savings by the combination of the two services, instead of having separate organizations—not only in small towns, but in the larger communities. Site and buildings, management, clerical, and other expenses, co-ordination of main work, the utilization of coke for steam raising (or in the smaller schemes, town gas), and the revenue from the products of the coal used for the production of the coke or gas employed in electricity generation—the obvious savings are manifold; and there is no reason why they should not materialize. In small places the economies are as the load increases manifesting themselves in the prices charged to the consumers, which justify the development. The article by Mr. Bond describes the electrical equipment which has been designed for Port Talbot. In the main power station, there is to be a 100 KW. and two 250 KW. three-phase alternators, driven by "Premier" horizontal gas engines, fed with town gas. Low-pressure generation has been decided upon; the men on the works being accustomed to a low-pressure electrical system which has been employed for some time to drive the retort-house charging machinery. Naturally, in the early stages, Mr. Bond is anxious to utilize his present staff as far as possible, in order to keep down expenses. An interesting paragraph in the article describes a feature of the gas-engines which, it is anticipated, will reduce materially the gas consumption. This is a series of valves which will enable one or more cylinders to be cut out and in, according to the load on the set. It is believed that this is the first application of this arrangement, and its behaviour is being watched with great interest. We shall be glad later on to hear more as to the experience with this particular form of "fuel economizer." We think our electrical friends will agree that, for the installation described, being a small plant, £23 per KW. is a satisfactory item. The article will, we are sure, be widely read by both gas and electrical engineers.

The Port Talbot Combination.

Last Days.

The electrical papers appear to have had from some quarter an intimation that it would be well to do a little whipping-up to get, before the closing day, more visitors to the electrical display in the Palace of Engineering. So long as there is a line of spectators on view, it will be better than having no visitors to send men there who are working in the industry. Preferable, of course, would be to have spectators from the public. We hear a great deal about the "orders" that have been booked in the electrical section. The figures have never been stated to have official origin. There have also been statements as to the marvellous numbers of visitors to the stand, and as to the magnificent display of interest. We have been through the display of the "E.D.A." several times—in different months, weeks, days, and hours, and have never seen visitors crowding and jostling each other, and there has been no great animation. On our last visit less than a week ago, seven visitors were counted examining the rooms, and one gentleman of leisure was on view, in front of the "rendezvous," lolling in a big easy chair. In the Gas Exhibit, within five minutes afterwards, we came across a real crowd of men and women watching the industrial demonstrations, and there were probably forty to fifty persons in the section where the "Seven Ages of Woman" are depicted. This was in the morning. Within the past few days articles have appeared in the Press—technical and daily—on the electric lighting at the Exhibition. And the Exhibition closes on Nov. 1!

A Challenge Refused.

Mr. Sam Hall, gas salesman at Leith, has been reading the claims of Mr. L. L. Robinson, the Electrical Engineer of Hackney, regarding electric cooking; and he is an unbeliever, because he himself has made a series of most careful tests, and is convinced that, however useful electricity may be for various applications, it is an absolute back number and an expensive fad so far as cooking and heating are concerned. He has therefore challenged Mr. Robinson to a public test to settle "once and for all the relative efficiencies of gas and electricity for cooking and heating." Gas had made big progress before all this electrical palaver about heating and cooking saw the light of day. Since then the progress of gas has been accentuated; and our makers of gas fires and cooking apparatus are busier than ever, and the fittings staffs of gas undertakings are the same. We are afraid the compilation of current additions of gas fires and cookers and of electric fires and cookers, would show such a large difference in favour of gas that the electrical people would not appreciate such publicity. Mr. Sam Hall earnestly hopes that Mr. Robinson will accept his challenge. But that gentleman has no intention of doing so. He is no doubt a good judge of his capacity for coming out the victor; but if he was really as confident as he makes out he is, he would accept the challenge without delay. Instead, he refuses, and offers an alternative. Meekly and mildly he says: "I hope I may have the pleasure of meeting Mr. Hall some day, when I will gladly show him my volume of Consumers' Praise of the Electric Method." Fancy an engineer, and one who has written and boasted so much of electric cooking and heating, turning tail in this fashion, and offering a book of lay "praise" as an answer to a challenge to ascertain money and time costs for doing a definitely measured amount of work in the ovens and on the hotplates of gas and electric cookers! We are surprised at Mr. Robinson's not showing a more sportsmanlike spirit. He is as bad as the Socialist Government who, rather than have an inquiry into the withdrawal of the sedition case, prefer to hurry the country into a General Election. Mr. Robinson is not throwing us into a General Election, but he shuns an investigation of electric and gas cookers on conditions of equality in respect of work done. There is a question we should like to ask Mr. Robinson. He says in his letter of refusal, as published in the "Electrical Review": "The point is that the electric cooker under all sorts of use and misuse keeps up its initial efficiency." Will Mr. Robinson tell us where to get the electrical elements which maintain their initial efficiency throughout life? We have not yet come across them; and in all efficiency tests with electric elements, experience is that they do suffer progressive depreciation. We hope he will answer the question. It is rather important.

Competition in a Small Town.

The Amble and Warksworth Gas Company—one of the small Northumberland concerns—have adopted a progressive business policy; and now for the first time after many years they have paid a dividend, despite keen competition by the District Council Electricity Department, which, if we remember rightly, is not a paying concern. The Council are now holding out a sop to the householders of Amble. In a circular, they ask: "Would you use electric light if the Council fitted-up your premises entirely free of charge?" We hope the householders will not be deceived by the words "entirely free of charge." No business undertaking can afford to do such things "free of charge." Electrical installations cost a lot of money—if properly done, so as to avoid risk of fire and other uncomfortable happenings. And the Amble Council can no more supply houses with electrical wiring and fittings than we could do without making a charge for the work and materials. The installation cost is to be met from the 1s. per unit which the Council are proposing to charge; so that it is false to say the installations are "entirely free of charge." We have not yet heard whether the Council will proceed with the scheme. They will only do so providing a sufficient number of people avail themselves of the offer. Their suggestion as to installation is interesting. It is to instal three lights, complete with plain pendants, opal shades, and 30, 40, or 60 watt lamps, together with a service cable, and a shilling-in-the-slot meter. Lamps and shades are to be maintained by the consumer. A unit of electricity, it is stated in the circular, will supply a 30 watt lamp for thirty-three hours, a 40-watt one for twenty-five hours, or a 60-watt one for sixteen hours. If the three lamps are in use at the same time, the thirty-three hours will be reduced to eleven, the twenty-five to eight and one-third, and the sixteen to five and one-third. If the householders want light for working, reading, or writing, they will avoid the 30 and 40 watt lamps, and adopt the 60-watt ones, and then to prevent harm to their eyes will shield them. The Gas Company are offering better service. They point out that a No. 1 "Duralite" burner will give seventy-two hours' light for 1s., a No. 2 forty-eight hours, and a No. 3 thirty-two hours. They also state that "where fine work, reading, or sewing is done, or where the care of the eyesight is considered, gas lighting, maintained in efficient order, provides the finest artificial lighting obtainable." That is true. But above all we congratulate this little Company on their enterprise in undertaking the periodical cleaning of lighting burners free of cost, charging only for replacements of mantles, &c. That is the most effective way of retaining the lighting business.

The Heating Season.

The electrical papers have, with the coming of lower temperatures, suddenly found out that the heating season is upon us. Real business men anticipate its coming, and start on the heating business before the heaters are actually required. One writer in an electrical paper is glad to see that the prices per unit for heating and cooking are being lowered in many more places, and that showrooms are giving evidence of a greater interest in these branches of business. The gas industry is glad of this, because the quicker the electricity industry prevails upon a few people to try electric ovens and hotplates and electric fires, the faster will the news spread that efficiency and economy are sadly depreciated by the change from the one agent to the other. A hint of the dissatisfaction found with electric heating is seen in the advice of one electrical writer: "Under 2 KW. I would suggest keeping to fires of the reflector type—except, of course, for very small rooms with very little window area." If you want to get warm with an electric fire under the 2 KW. size, then the rooms

must be small, almost devoid of ventilation, stuffy, and therefore unhealthy. While writing, we notice that a V. W. Dale (we will assume the writer is a man), in an article contributed to "Electrical Industries," makes a remark which it is difficult to understand: "Fuel heat is obtained by gaseous flame resulting from combustion with oxygen, creating smoke and soot." Will Mr. Dale or someone who can better express himself tell us exactly what is meant by that cryptic statement? It would also seem from what Mr. Dale says that there are several brands or qualities of heat, as electric heat "is the most perfect heat obtainable." He also suggests that a woman is the salesman's line of least resistance; and this indicates the direction in which they should expend the bulk of their propaganda and selling energies. Is that genuine salesmanship? It would be unfair not to give Mr. Dale credit for some wisdom. He says, for instance, "to sell a 750-watt fire under misapprehension as to its limitations is fatal." That has been a big mistake on the part of electrical salesmen. It is preferred by Mr. Dale rather to sell on the big side, and show the consumer how to effect economy by switching-off part of the heat output. That is all very well. Put into the hands of the consumer an instrument by which heat can be expended lavishly, and it will often be fully used. Then the dearer the heat, the more effectually will the "big fire" idea create dissatisfaction when the account comes in. Much of this sort of thing has been met with, and the gas-fire has frequently succeeded to the places occupied by electric fires. The electrician tells the consumer this is fancy and not fact. The fact can be demonstrated by the presence of many gas-fires in this country where electric fires stood before.

Heating Costs.

Mr. Dale also advises that the salesman should, in his deals with the consumers, make price an incidental, and "idea" and service fundamentals. Later on he indirectly gives a reason for this. He says that a gas-fire using 33 c.ft. per hour would at 5s. per 1000 ft., or 1s. per therm, cost 2d. per hour; with electricity at 1d. per unit, a 2 kw. electric fire could be used at the same cost. The gas is of 500 B.Th.U. quality, seeing that 5s. per 1000 c.ft., or 1s. per therm, is mentioned. We should like Mr. Dale to explain why 16,500 B.Th.U. worth of gas should be required as against only 6840 B.Th.U. with electricity to do an equal amount of work. His answer may lead to an invitation to him to do a little testing of the products of combustion of gas to ascertain the amount of heat passing away from a modern gas-fire, supplemented by a test to find the radiant efficiency. We think then we shall be able to prove to him (if he will publicly acknowledge the results) that something like 75 p.ct. of the heat units of the gas are given to a room as useful heat. This being so, why should a room require 12,375 B.Th.U. from a gas-fire, and only 90 p.ct. or so of the 6840 B.Th.U. expended by 2 kw.-h.? We await Mr. Dale's answer.

BRITISH EMPIRE EXHIBITION NOTES.

Rubbish Disposal Problem.

It has been remarked before that one of the problems by which the authorities were faced at a comparatively early period of the Exhibition was the disposal of the rubbish. Probably to anyone not at all closely acquainted with Wembley this problem might, at first blush, not appear to be a very big one; but, as a matter of fact, in a place of this character where a large number of people congregate, the refuse left behind is great in quantity and varied in character. At the British Empire Exhibition its chief constituents (necessarily changing with the time of year) have been orange peel, banana skins, brown paper, paper bags of all descriptions, empty ice-brick boxes, and wet refuse from various restaurants (including large quantities of bones, boiled rice, and fish refuse), together with the clearance from stables, and a variety of other articles. Motors have been employed collecting from the various receptacles, and at times as many as 25,000 bins a week required destruction. The difficulties were, of course, greatly increased in wet weather, when the refuse collected from the bins was in a wet and sodden condition. The destruction of this refuse it was determined should be carried out in the Exhibition grounds, and a number of incinerators were installed for the purpose. These were placed to the east of the grounds, so that as little annoyance as possible should be caused by smoke, &c., drifting over the exhibition. At an early stage, however, it was found extremely difficult to deal with the vast mass of rubbish, and it started accumulating at a rapid rate. A number of additional incinerators were then built, but the problem before the authorities grew in magnitude and, from hygienic considerations, called for prompt measures.

The Gas Incinerators.

Fortunately, at this point the Brentford Gas Company volunteered their services in an endeavour to deal adequately with the matter, and their offer was accepted. The Company promptly proceeded to run a 3-in. wrought-iron supply along the outside of the incinerators, and to attach to each incinerator a specially constructed burner for the purpose of ensuring that flame would be always present in the incinerator, and that smouldering, accompanied by black smoke, should cease. The burners, each of which consumes 120 c.ft. of gas an hour, are so formed as to avoid any dust accumulating in them. That is to say, in a horizontal position a projection of the top portion provides sufficient shield against the accumulation of ashes, &c. The burners are taken into the incinerators at a short distance above the air inlets, and are accordingly free from any disturbance when the necessary raking-out of the dust and ashes of the furnace is done. They are not used continually, but only as and when the refuse requires. Dry paper, for instance, will burn readily by itself, but waste from restaurants, and similar material, will not, and it is for this that the burners are required. The consumption of gas in these incinerators during the period they have been in operation has been a little over 600,000 c.ft., and they have entirely solved the difficulties which previously existed.

Last week the writer made an inspection of the installation, when he had the pleasure of meeting Major Turnbull, the officer in charge of the portion of the grounds in which the incinerators are located. Major Turnbull stated that the difficulty of disposal had ceased, and that he could now deal with all refuse promptly. In fact, the whole of the refuse which was awaiting destruction at the time of the visit could, he declared, be burned in half-an-hour. This use for coal gas may be commended to distributing engineers as something which it would be well worth their while to follow up. It should also be made known to hospitals and similar institutions that gas offers a readily available and highly efficient method of disposing of not easily destructible refuse.

Crozier Retort.

During the latter half of the run of the Exhibition, a 10-ton working unit of the "Crozier" retort for the treatment of oil shale and coal has been available for demonstration purposes behind the Burma Pavilion. It is being shown by Mineral Oils Extraction, Ltd., and is in charge of the inventor. It is said that both capital and operating costs are low; the retort being simple in construction and working, and free from the possibility of mechanical troubles. It is also designed to permit a primary fractionating and semi-refining of the oil direct from the shale in one continuous process of operation; this fractionation materially reducing the cost of subsequent refining. The heat for treatment is introduced by means of a series of flues which traverse the retort diagonally. These flues are at such intervals as will permit an effective heat penetration into the mass of the shale, and at the same time allow ample free space for the movement of the material. The internal flues take the heat from external flues which encompass the retort; the passage of the heat in both sets of flues being controlled by means of dampers allowing of independent temperature variation in each section of the retort. The shale, broken to a proper size, is fed in continuously at the top of the retort. Steam is admitted to the retort at several points.

ARCHITECTS AT THE GAS EXHIBIT.

Co operation Between Art and Industry.

In felicitous terms, the toast of "Co-operation between Art and Industry" was proposed by Mr. F. W. Goodenough, speaking on behalf of the British Empire Gas Exhibit Committee, at the Great Central Hotel, Marylebone, last Saturday; the occasion being a luncheon in connection with an official visit to the Gas Exhibit at Wembley of the Architects' and Surveyors' Assistants' Professional Union. The visitors included members of the Metropolitan Branch, and delegates from all the Provincial Branches of the Union. The party who sat down to lunch, under the Chairmanship of Mr. Goodenough, numbered 85; among them being the President of the Union (Mr. J. W. Dennington, L.A.R.I.B.A.) and Mr. C. M'Lachlan, A.R.I.B.A. (Chairman of the Executive Council of the Union).

Mr. Goodenough said that, on behalf of the British Empire Gas Committee, he welcomed the guests very heartily. It was a pleasure to think that they and their fellow members were going to pay a visit to the Gas Exhibit at Wembley. Wembley stood for co-operation throughout the Empire, and the Gas Exhibit there stood for co-operation throughout the gas industry. This gathering, and one of the present visitors' seniors which took place early in the summer, illustrated the co-operation that existed, and which they were very glad did exist, between the gas people on the side of industry and the architects on the side of art. The toast he was going to propose was that of "Co-operation between Art and Industry." Co-operation was the greatest need of the world to-day in every walk of life, in every industry, in every profession; and anything that any of them could do to forward the cause of co-operation he was sure they would agree should be done. Co-operation involved the use of imagination, to enable them to see each other's point of view; real humility, to enable them to give true value to the other man's point of view (because it was not much use seeing it, if one did not realize its value); and most of all it needed good humour to enable them to carry on together in harmony. They in the gas industry had for a long time realized, and done their best to foster, the growth of co-operation between the architect, who designed and re-designed and decorated the homes of the people, and the gas industry whose business it was to supply these people with the most efficient and economical, and also artistic, means of heating, cooking, hot water supply, and lighting. He used the word "artistic" even in reference to such matters as water heating, because he thought they would agree that the artistic was really that which best fulfilled its purpose in design, construction, and general appearance. Art was the fitting of a thing to its purpose in the best possible way.

By its co-operation the gas industry was able to render a service to the community, not only in providing efficient, economical, and artistic appliances, but in reducing drudgery in the home and elsewhere, and

in abolishing smoke. They in the gas industry took a pride in their work, because they believed they were able to serve, not only the individual, but the civic community, by the purification of the atmosphere, and the nation by the conservation of coal. They must not believe all they heard as to the best ways of using coal. If they did so, it must seem to them that the gas industry was doomed to extinction. It had been doomed to extinction in this way ever since he could remember, and yet it was going stronger to-day than ever before. When they considered the following facts, they would realize that the gas industry, at any rate, was a very lively corpse. [Laughter.] The output of gas in this country, in spite of the great increase of efficiency in all applications, had increased from 160 thousand million c.ft. in 1902 to 265 thousand millions in 1922—in other words, it had nearly doubled in twenty years—and, further, this increase of 105 thousand million c.ft. was made up of 45 thousand millions in the first ten years, and 60 thousand millions in the second ten years. Every gas undertaking in the country to-day was busier than it had ever been before. While other people had been talking about unemployment, the gas industry had been helping to solve the problem by engaging more men. The Company he had the honour to serve were employing now nearly 300 more fitters and mates than they were this time last year, which was about the best practical way of curing unemployment. The increase in the number of appliances fixed by the Company in the twelve months ended a week ago was 58,000, as compared with 45,000 in the preceding twelve months, which was a record figure. This, again, meant a substantial increase of employment of men in foundries and works generally, in turning out the appliances, and it also meant the employment of more men in making gas. So they could look the world in the face, and say they did not want any Unemployment Grants for the gas industry.

This rapid increase in the use of labour saving and smoke avoiding appliances was really having an effect upon the atmosphere of towns. The days of fog were fewer, and those which came were far less terrible than was the case years ago. Gas had been able to effect a very material improvement in the atmosphere of every city in the country; and this was work in which architects and the gas industry were able to co-operate. ["Hear, hear."] A gas fire could be installed in any room, however beautiful, and form a harmonious part of that room. The gas fire could be made a part of the unity of the room, and not appear to be an added after-thought, as some of the old gas fires did. Mr. H. Austen Hall, the Architect of the Exhibit, who had asked him to express his great regret that he could not be there that day, had made a beautiful job of installing gas fires as they should be installed, to form part of the unity of the room; and a successful effort had been made to show that, in connection with any scheme of decoration, gas could be used, both for lighting and heating, without any detriment, and generally with benefit, to the whole scheme.

He would like to say that the gas industry did try to give a square deal to the consumers. It seemed to him that, in regard to no other necessity of both home and factory was the consumer so well protected in the matters of quantity, quality, price, and profit as was the case in connection with gas. No gas company ever got paid for more than from 92 to 95 p.ct. of the gas that the meters on the works measured as having gone out on to the district. In any town outside a mining area, the actual leakage was a negligible percentage; the remainder of what was termed unaccounted-for gas was due to the fact that meters registered on the average in favour of the consumer, and not of the company. The fast meters were found to be fast to a much smaller percentage than the slow meters were found to be slow.

The best and surest reward came from service, and not from selfish self-interest; and the gas industry knew it was able to serve the public in more ways than merely supplying them with gas. It believed that prosperity must be based upon public satisfaction. The British Commercial Gas Association were working on the principle that the satisfaction of the customer was the aim and object of industry, just as it was the aim and object of every profession. What he hoped, and believed, would be the case in the future, in this country and elsewhere, would be that to be called "a nation of shopkeepers" would cease to be in any sense a reproach, and would become an honour—that it would be just as worthy to serve the community as a shopkeeper as it would be in any other way. He believed that the profession of business could be, and should be, and in many cases was, as honourable as the profession which their guests that day served. He coupled with the toast the name of Mr. C. M'Lachlan, the Chairman of the Executive Council of the Union.

Mr. M'Lachlan, in response, heartily thanked Mr. Goodenough and those associated with him for the very kind hospitality that had been extended to the Union. Members from as far north as Inverness and Aberdeen, and as far south as Devon and Cornwall, had assembled to see the Gas Exhibit. Art had always had to have a patron, and to-day the real patron of art was industry. Art under the patronage of industry was making immense strides forward. The elimination of smoke by the use of gas was an illustration of the co-operation of industry and art. Everyone was much better off for it, in health and otherwise. It was only in leisure that people could appreciate art, and the gas industry had given them more leisure in which to do so. He asked Mr. Goodenough to express to his Committee the very great pleasure it had been to those present to accept the invitation that day. [Applause.]

At the Gas Exhibit, the party were met by many more members of the Union; and after the inspection, about 300 guests were entertained at tea in the Regent Restaurant.

Low **Temperature Carbonization, Ltd.**—This firm have concluded a fourteen years' contract (with the option of renewal for a further similar period) with the City of Nottingham for the daily supply of gas of 500 B.Th.U. quality. To carry out this contract, arrangements have been made to erect and equip a low-temperature carbonization works using the Company's standardized retorts to treat 1000 tons of coal per day. This work will be carried out by Gas and Fuel Plants, Ltd., in co-operation with Kerr Stuart & Co., Ltd., and Henry Boot & Sons (London), Ltd.

THE GAS EXHIBIT.

A German Appreciation.

In "Das Gas- und Wasserfach" for Sept. 6 and 13 appeared an account of the Wembley Gas Exhibit and the proceedings at the World Power Conference. These were contributed by an official of the National Coal Council of Germany, Herr Dipl.-Ing. F. zur Nedden. While it is not necessary to reproduce in any detail his description of the Exhibit, some of his appreciatory remarks, and the light in which British propaganda efforts struck him, may be not without interest to our readers.

"That neither the World Power Conference nor the British Empire Exhibition at Wembley," he begins, "would be likely to have, technically speaking, much to teach us, could be assumed in advance. The Technical Press and association papers keep the technical world well up to date. Besides, the gas industry in Germany is on a high plane. But it was not in matters technical that the chief aim of the Exhibit and the Congress lay. They were intended, rather, to be highly specialized instruments of propaganda on behalf of a definite policy of energy distribution. Both the policy itself, and the means by which it is advocated, merit our closest attention."

Proceeding to the details of the Exhibit itself, Herr zur Nedden describes it as not very large, but excellently conceived, refined, and effective. Even its situation is cunningly planned, in a part of the Palace of Industry away from the machinery and electricity exhibits—so that interest is not dulled before reaching it—but in the midst of toilet wares, articles of personal adornment, and sweet things, to which ladies gladly congregate. The finely calculated psychological effect is planned especially for the benefit of the fair sex. On the other hand, the proximity of the Congress Rooms was calculated to be bringing frequently in the right direction numbers of the world's industrial chiefs, who might easily be enticed for a space from the turmoil of affairs by the tempting inscription on the door of the rest room.

The writer was much impressed by the fact that the Exhibit does not merely exist. It lives. Something is always going on, and public attention is everywhere directed towards it. The impression on his mind, of posters in gas showrooms, in omnibuses, on hoardings, in newspapers, in fact everywhere, was that anyone who happened to be in the neighbourhood of the Exhibit must involuntarily be drawn towards it, in order to see what the "Spirit of Coal" really had to offer in the shape of "Light, Power, and Heat."

After a general description of the main hall, all of which he finds admirable, he refers to the "Seven Ages of Woman." While the first impression which this section made on the foreigner's mind might perhaps be that it was rather ingenuous, he came to acknowledge that the speculation on the curiosity of the visitors had been justified, and the idea of making the exhibits work, in ordinary everyday surroundings, had been a great success. Referring to the more serious demonstrations of cooking and baking by ladies in spotless white, he remarks that "these are nothing unusual. In all the larger gas showrooms in the streets of English cities, such demonstrations of cooking, baking, ironing, and washing with gas are constantly being given. In fact, in some places competitions among consumers are organized, so that, even before marriage, a man may gaze with admiration at his Kittie or his Annie busy at work in an all-gas household." A special word of praise he has for the staff of attendants, both as regards the sufficiency of their numbers and their readiness and usefulness in imparting information to visitors.

After a general description of some of the exhibits—cookers, water-heaters, and so on—he refers yet again to the justification of having made the exhibit "live." For, at its very entrance, was there not really the most interesting and most instructive part of it all—the section dealing with smoke abatement, bye-products, and the history of lighting burners? Yet scarcely noticed, because entirely without life and movement. His comments on this fact are interesting. "We may well compare the comparative apathy of the British public for these excellent exhibits with the keen interest displayed in similar cases in Germany, as, for instance, at the Exhibition in Munich in 1922. It is not only the German's thirst for education which is thereby illustrated. The English have never come to know, as we have, the absolute necessity for economy. They have never been driven to the need for coal saving in the same way that we have. At the same time, English industry does not possess the number of federations and technical associations of all kinds, which in Germany devote so much of their attention to such subjects."

The report concludes with an account of the proceedings at the Power Congress. The foregoing extracts will serve sufficiently to show the admiration of the German visitor for our British efforts at a time when the gas industry in Germany is making strenuous attempts to improve its position by active and increasing propaganda.

The marriage of Miss Gladys Osmond and Mr. Cecil A. Marsh, of Bridport, was celebrated at All Saints' Church, Dorchester, on the 7th inst. Miss Osmond is the eldest daughter of Mr. Frank Osmond, Engineer, Manager, and Secretary to the Dorchester Gas Company.

NATIONAL GAS COUNCIL.

Central Executive Board.

The Central Executive Board of the National Gas Council met on Tuesday, the 14th inst., at No. 28, Grosvenor Gardens, S.W.—Mr. D. Milne Watson in the Chair.

Owing to the dissolution of Parliament, discussion of several items on the agenda were necessarily eliminated.

Gas Regulation Act—Special Order Procedure.

It was reported that, in view of the dissolution of Parliament, the Lords Committee who were considering the revision of Special Order Procedure would now cease to function, but would no doubt be re-appointed when the new Government came into power, so that several weeks must elapse before anything further would be heard of the matter.

Standardization of Contract Conditions.—Fundamental Clauses Prepared by the Federation of British Industries Contracts Committee.

It was reported that the Contracts Committee of the Federation of British Industries had been conducting an inquiry into Contract Conditions, with a view to securing the amelioration and elimination of harsh and arbitrary clauses. The Committee in question had now drawn up standardized conditions relating to arbitration, delay in delivery, damages for delay, liability for accidents and damage, and general liability of contractor.

It was stated that, in 1922, the Council, in conjunction with the Institution of Gas Engineers, had considered identical clauses, and the Council were prepared to oppose the clauses now put forward by the Federation, as they did not appear to be suitable for the gas industry.

The Institution of Gas Engineers were carefully considering the clauses drawn up by the Federation of British Industries, and would report shortly on the matter.

Federation of British Industries—Grand Council.

Mr. F. W. Goodenough and Mr. A. A. Johnston were re-elected to represent the Council on Sub Group 3 of Main Group 14 (Public Utility) of the Grand Council of the Federation of British Industries, together with Mr. A. Caddick (*vice* Mr. W. E. Price, resigned).

Mr. A. A. Johnston and Mr. Stanley H. Jones were re-appointed to represent the Council on Section 1, Main Group 9 (Chemicals, Fertilizers, and Explosives).

Smoke Abatement Conference—Manchester.

The Board agreed to the appointment of the following delegates from the Manchester district to represent the Council at the above conference to be held early in November: Mr. G. S. Frith, Mr. R. E. Gibson, Mr. F. Pye, Mr. W. J. Smith, and Mr. S. Tagg.

Board of Trade Inquiry into Trade and Industry.

It was reported that the Committee of Inquiry set up by the Board of Trade were about to commence proceedings, and it was agreed that the Council should at once apply to be heard.

Murdoch's House at Birmingham and the Murdoch Gasholder.

A letter was reported to have been received from the Institution of Gas Engineers recommending the Council's sympathetic consideration of a scheme for the acquisition of the house in Birmingham where Murdoch for many years was occupied in his epoch-marking inventions in connection with the gas industry, and for the preservation, as a national memorial, of the first gasholder, which was used by Murdoch at the works now in the occupation of Messrs. Avery, Ltd., at Smethwick. It was decided to set up a small Committee of representatives from the Institution of Gas Engineers, the Society of British Gas Industries, and the Council, with a view to considering the proposition and reporting thereon.

Mains in Public Roads.

It was reported that a letter had been received from the British Water-Works Association announcing the receipt by them of a letter from the County Councils' Association, suggesting a conference between representatives of the County Councils' Association and all bodies representative of authorities having statutory rights to lay mains, pipes, and cables beneath highways. The letter from the County Councils' Association enclosed a report of their Highways Committee, containing recommendations regarding: (1) The appointment of a Royal Commission to make a comprehensive inquiry into the whole question of the use of public highways; and (2) the holding of a conference between representatives of all parties concerned, presided over by an independent chairman, with the object of formulating an agreed clause with regard to the use of highways for the laying of mains, pipes, and cables.

It was agreed to appoint a small committee to meet the water authorities and other interests previously convened by the Council, in an informal preliminary conference.

Appointment of Assistant Secretary.

The Board approved the appointment of Mr. C. M. Plowman as Assistant Secretary to the Council.

THE INFLUENCE OF CATALYSIS ON CARBONIZATION.

[Abstracted from a Paper read by R. Lessing and M. A. L. Banks at a Meeting of the Chemical Society on Oct. 16.]

Most interesting work has been undertaken by R. Lessing and M. A. L. Banks on the catalytic effect of individual inorganic compounds on the carbonization of coal. A difficulty in this study lies in the fact that the original coal ash cannot be reduced beyond a certain minimum by purely physical means; and the catalytic effect of any added substance must be influenced or obscured by these residual mineral constituents, which are mixtures of carbonates, silicates, and sulphides of alkalis, alkaline earths, and other metals, and possibly salts of these.

Experiments on Sugar and Cellulose.

In the first instance, therefore, experiments were carried out on pure sugar and cellulose. Varying quantities of H_2SO_4, $MgCl_2$, $CuSO_4$, $Al_2(SO_4)_3$, NH_4Cl, $FeCl_3$, $FeSO_4$, NaCl, $Ni(NO_3)_2$, KNO_3, $Cu(OH)_2$, $NaHSO_4$, Na_2SiO_3, Na_2CO_3, K_2CO_3, NaOH, $MgSO_4$, $Al(OH)_3$, Al_2O_3, $CaCO_3$, SiO_2, $MnSO_4$, China clay, $(NH_4)_2CO_3$, $Fe(OH)_2$, Na_2SO_4, FeS, $NiCO_3$, CaO, $(COOH)_2$, CuO, MgO, and NiO were added to the sugar and cellulose, and the mixtures were heated in a platinum crucible under standard conditions, but for three minutes only, instead of seven minutes customary in coal analysis. In all, forty compounds were tested, and the coke yield varied from 18·74 p.ct. to 5·02 p.ct. in the case of sugar, and between 20·36 p.ct. and 5·10 p.ct. in the case of cellulose. An attempt was made to place the results in groups, in order to ascertain the principle which controlled the yield of coke. By taking coke yields of 12 p.ct. and 9 p.ct. as tentative limits, the results arranged themselves into three main groups. Into the highest group fall salts of strong acids and weak bases; the lowest group consists of compounds which do not change the coke yield appreciably; while the middle group consists of a puzzling combination of alkalis and metallic salts with no obvious rational connection. Oxalic acid, the only organic compound added, produces alone a lower coke yield from cellulose. In the case of sugar it shares the distinction with the oxides of copper and nickel, and curiously also with lime and magnesia. Apart from these quantitatively unimportant exceptions, it may be said that any compound which acts at all does so in the direction of an increase in the coke yield.

Whether the action is truly catalytic, state the investigators, cannot be decided on the evidence so far obtained; and definite proof seems difficult since the great majority of chemical reactions involved in carbonization are irreversible. The small quantity, however, needed for influencing the carbonizing equilibrium towards the formation of solid or volatile products of thermal decomposition points to their acting as catalysts. It is likely that the added compounds undergo definite reactions, along stoichiometric lines, with equivalent quantities of carbohydrates, and that this type of reaction thus initiated, such as hydrolysis, scission of groups, or opening of rings, influences the course of carbonization in the direction of a higher or lower coke yield.

Effect on Appearance and Structure of Coke.

The remarkable quantitative variation in the yield of coke is equalled, if not surpassed, by extraordinary differences in appearance and structure. The majority of the catalysts producing high or medium high coke yields make swelled cokes when sugar is carbonized with its own weight of water, and compact cokes when dry sugar is heated. Exceptions are compact cokes with most chlorides and sodium silicate by the wet method, and swelled cokes with sulphuric acid, sulphates, sodium chloride, and potassium nitrate by the dry method. Differences extend to the surface structure of the coke, its colour, iridescence, brightness, and density and true porosity. Brightness is enhanced by chlorides and nitrates, but alkalis give a dull sooty surface by the dry method.

The effect of catalysts on the coke yield obtained has a bearing on the question of charcoal activation, the implication being that the density, size and shape of pores, and the true and apparent density of the char are subject to similarly great variation.

Experiments with Clarain and Vitrain.

A few preliminary experiments were made with coal. In order to reduce the ash difficulty to a minimum, the constituents having the smallest percentage of mineral matter were selected—viz., clarain and vitrain from Dalton Main coal. The coal was carbonized in an electric coking furnace, and the tests were carried out as specified in the Interim Report on Coal Analysis of the Fuel Research Board, 1923 [see "Journal" for Dec. 5, 1923, p. 638]. The results show that the effect of the catalysts is a distribution between the solid and liquid products of coal carbonization; the gas yield being merely a function of the temperature of carbonization. The coke yield varied from 65·7 p.ct. to 57·62 p.ct.; the coke yield from the untreated coal being 53·6 p.ct. The number of catalysts tried is considerably smaller than that used in the sugar and cellulose experiments; but they arrange themselves in practically the same order. The external appearance and size of the coke cylinders obtained do not vary to any extent, but there are indications that their internal structure, and consequently the density, porosity, and reactivity differ very considerably. It should be remembered, state the authors, that the coal

examined consists only of clarain and vitrain, and that the results obtained must not be applied without discrimination to other coal constituents, and still less to coals of different types or origin.

SCIENTIFIC AND INDUSTRIAL RESEARCH.

Report of the Committee of the Privy Council for 1923-24.

There was recently issued the Ninth Annual Report of the Committee of the Privy Council for Scientific and Industrial Research, which covers the period from Aug. 1, 1923, to July 31, 1924, and contains a great deal of information. Copies may be had, at the price of 3s. net (postage extra), from H.M. Stationery Office, Imperial House, Kingsway, London, W.C., and Branches.

Work of the Advisory Council.

The report of the Advisory Council on their own proceedings and on the progress of the scientific work of the Department is included, and is followed by a summary of the results accomplished during the past year by the various research organizations. In consequence of recommendations to the Committee of the Privy Council by the Advisory Council involving an extended programme of research for 1924-25, net estimates have been drawn up by the Committee amounting to £328,281, as compared with £276,863 for 1923 24, and £297,437 for 1922-23. The death of Sir George Beilby on Aug. 1, it is pointed out, deprived the Advisory Council and the Department of the greatest authority in this country on the problems of fuel research, which are now engaging the attention of all classes of the community in an ever-increasing degree. He was one of the original members of the Council when established in 1915, and was throughout one of the most active and valued workers. First Chairman and Director of the Fuel Research Board, to him are solely due the creation of the necessary organization and the design and building of H.M. Fuel Research Station at East Greenwich. The Report of the Committee of the Privy Council (which is signed by Lord President Parmoor) goes on to say of Sir George Beilby:

> He, more than any other man, put the scientific knowledge of low-temperature carbonization on a firm basis; his work on gas standards had a formative influence on recent legislation for the gas industry; and his skill as a microscopist opened-up a fascinating direction for research into the structure and behaviour of coke. It is with the deepest regret that we lose his wise and experienced counsel and the great scientific and practical knowledge he brought to the many difficult questions with which the Department in the early years of its existence had to deal. We desire on behalf of the Government and the nation to place on record our high appreciation of all that he so generously and freely gave them both during the war and in the hard and critical years which have succeeded it. Through all, his aim and effort were to help to the utmost the re-establishment of this land and people.

In scientific matters great progress has been made in the direction of active intellectual co-operation between different departments for the solution of problems; remaining difficulties relating principally to questions of organization. These are, however, fast disappearing, and the time is looked forward to when the Government should have at their disposal a suitable staff who will be competent to recognize the scientific significance of the practical difficulties that arise, whose duty it will be to know the existing facilities for dealing with the problems involved, and whose standing will command acceptance by the scientific heads of the Departments.

Fuel Research Board.

The report of the Advisory Council, whose Administrative Chairman is Sir William S. M'Cormick, LL.D., and the summary of the work of the Research Organizations of the Department contain lengthy references to the Fuel Research Board, and these will be found on p. 100 of the "Journal" for Oct. 8. It will be seen from them that a scheme of extended activity of the Board was recommended by the Council; and this programme has been fully endorsed by the Privy Council Committee and the Government, both of whom were impressed by the importance of doing everything possible to promote research into the proper utilization of coal. The proposals consist of the more rapid development of the chemical and physical survey of the coal seams in this country, and the conduct of tests, under special conditions—which will be found set out in the "Journal" for Sept. 3, p. 747—at the cost of the State, of any promising plant or process for the low-temperature carbonization of coal. Provision will be made in the estimates of next year for the additional expenditure involved.

Finance.

The expenditure of the National Physical Laboratory during 1923-24 amounted to £162,290, and that on the work of the Fuel Research Board to £46,391. The latter sum does not include a grant made, on the recommendation of the Board, to the Manchester City Council for research on domestic heating. Receipts by the Fuel Research Board from testing fees and sales of by-products totalled £3978. The balance of the "Million Fund" remaining unexpended on March 31 last was £618,318. The British Scientific Instrument Research Association have accepted an offer of further grants from the Department of £10,000 a year for five years, on condition that the industry subscribes annual sums rising from £1500 in the first to £2250 in the fifth year. The particular circumstances of this industry called for exceptional treatment, because the advance of science is largely dependent upon the continued improvement of scientific instruments, and because the work of the Association is an important supplement to the research undertaken in the interests of national defence. During the year 291 grants were made to research workers and students in training. The total expenditure on the grants to research workers and students is estimated at £41,000.

Co-ordinating Research Boards and Committees.

Difficulties experienced by the Chemistry Research Board through lack of facilities are to be overcome by the erection of a chemical laboratory on a modest scale in close proximity to the National Physical Laboratory at Teddington. After due consideration, it was decided that the grant for the purpose to the Institute of Metals should cease, and that the Chemistry Research Board should make arrangements for carrying on the general study of corrosion of metals. The Board have set up a Committee, with Prof. Carpenter as Chairman, to supervise the researches, and Dr. G. D. Bengough is in direct charge of the investigations. The Oxygen Research Committee having completed a report last year, any further investigation that may be necessary in this direction has been placed in the hands of the Chemistry Research Board. In thanking the Oxygen Research Committee for their work, the Advisory Council add: "While we fully realize the industrial possibilities of the use of oxygen on the large scale, provided it can be made sufficiently cheaply, we have not yet had brought to our notice any method of cheap manufacture except as a bye-product of other industries."

Illumination Research Committee.

The Committee that the Council recommended last year should be set up (under the Chairmanship of Mr. C. C. Paterson, O.B.E., M.Inst.C.E., M.Inst.E.E., and including Dr. J. S. G. Thomas and Mr. L. Gaster) to take charge of research into problems of illumination, have submitted a preliminary programme. They have decided to concentrate their attention for the present on certain main lines of inquiry calling for the co-ordination of physical, physiological, and engineering research. Two Sub-Committees have been formed, one for the investigation of the nature of illumination necessary for difficult factory processes, and the other to consider the architectural aspects of illumination. Both have made considerable progress, and much useful information is expected to be gained as the result of an examination of the particular conditions affecting compositors' work. The Architectural Sub-Committee have in hand, among other things, research into the best method of artificial lighting of picture galleries.

National Physical Laboratory.

The programme of research here includes an investigation of the thermal properties of metals at high temperatures, the measurements being made on samples of high commercial purity, and also on specially pure specimens prepared in the Metallurgy Department.

The work on light standards has been of considerable importance. A meeting of the International Illumination Commission was held at Geneva in July, when the question of standards for the measurement of light sources of high luminous efficiency was considered. The Photometry, Heat, and Optics Divisions of the Laboratory have been co-operating in work on this subject, with a view to laying down a satisfactory basis for the comparison of light sources of different spectral composition.

"Spun" Pipes.

In the section dealing with the work of the Building Research Board, it is stated that a series of tests has been completed to determine the modulus of elasticity of "spun" concrete, with special reference to the modulus in tension. This material, which is compacted by centrifugal force, is employed principally in the manufacture of pipes subjected, when in use, to internal pressure, and thus to tensional stresses. It is proposed shortly to publish the results of this work.

Gas Cylinders Research Committee.

Several sets of cylinders of alloy steels and of duralumin have been tested at the National Physical Laboratory. Experimental work is, however, to be carried somewhat further before the Committee report on the desirability of the use for special purposes of light cylinders of these materials. Reports from the National Physical Laboratory on the effects of repeated annealing and repeated normalizing of 0·25 p.ct. carbon steel and 0·45 p.ct. carbon steel have been considered, and after a few further experiments the Committee hope to be in a position to publish recommendations with regard to the periodical re-heat-treatment of gas cylinders.

There are a number of appendixes to the report—the first setting out the constitution of the Research Boards and Committees of the Department. Another gives useful information as to developments in the organization of research in other parts of the empire.

Missing Pressure and Heat Loss in Gas Engines.—At a meeting of the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, S.W., at 6 o'clock next Friday evening (Oct. 24), Prof. W. T. David, M.A., D.Sc., of Leeds University, is to read a paper on "The Missing Pressure in Gas Engines; and Heat Loss in Gas Engines."

THE SOUTHERN ASSOCIATION AT PORTSMOUTH.

Gas Efficiency and Service on Portsea Island.

LAST Friday the members of the Southern Association of Gas Engineers and Managers and numerous guests made an eager response to the invitation extended to them by the Portsea Island Gas Light Company; and many ladies accompanied them on road and rail to the island which has played so large a part in our history. They were favoured by Indian summer and the open-handed hospitality of the Chairman and Directors of the Company; and all will long remember the untiring efforts of Mr. Carmichael and Mr. Stibbs, and their marked success in adding another red-letter day to the annals of the Association.

We have chosen the above sub-heading for this report because the day's proceedings left in the mind an impression not only of efficiency and service in the works and sales departments respectively of the Portsea Island Company, but of the interdependence of the two departments—a fact which fortunately is nowadays more widely recognized. The point was stressed both by the Engineer and by the Secretary, and by Mr. P. G. G. Moon (the Senior Vice-President of the Association) in the course of after-luncheon speeches; and because this fact has long been known in Portsmouth, their undertaking is now about seventeenth in the United Kingdom in respect of gas output, and their showrooms undoubtedly stand near the top in respect of magnificence and selling utility.

CHIEF OFFICES AND SHOWROOMS.

The headquarters of the Company, which occupy a prominent position in Town Hall Square, Portsmouth, were the rendezvous last Friday; and the visitors had an opportunity of looking round and admiring them while the train from London was awaited. The present magnificent building took the place of the original chief offices (erected in 1877) in the early years of the war. The architect was Wilkins, of Adelphi; and the master hand is betrayed in the proportioning and ornamentation of the interior no less than in the imposing elevation of the building.

CHIEF OFFICES, TOWN HALL SQUARE, PORTSMOUTH.

The six fine show windows may be seen in the photograph which we reproduce. Showcards were conspicuous in these, and their story was very well told—one indicated "five good things for the housewife;" another, in a fascinating dining room complete with wireless, purported to carry a useful "radio" about gas. Next to the dining room was a drawing room furnished in equal taste; and another window showed a palatial mantel and fire—all in oxidized silver finish. The remaining ones contained things more prosaic, but very desirable—"Kleenoff," vitreosil ware, "Economy" and "Pearl" adapters, and so on.

One enters the building through a handsome porch on the side of which is the Company's War Memorial Tablet. Inside, the lack of congestion makes the first appeal, and then, perhaps, the mosaic floor, which is so much more serviceable than parquet and rugs. Certainly the chief "show" features last week were the model bathroom and model kitchen. The recess in the latter contained a Fletcher "Kingsway" cooker, a Potterton No. 20 "Victor" circulator, and a gas-fire; and a "Swift" heater supplied water to the sink. There was also a gas copper; and a Ewart "Caliphont" was fitted for demonstration purposes. The kitchen table was used for the display of "Kleenoff," brushes, and descriptive literature. The Potterton circulator in the kitchen supplied bath, shower, towel rail, and basin in the bathroom; and in the latter there was also a Ewart "Lightning" geyser with automatic gas and water supply.

The bathroom and kitchen are one on each side of the marble staircase and lift, and on the other side of the showroom is a series of fires and mantels. Other fires are arranged round a show pillar, and a few selected cookers are on view; care being taken not to crowd things or arrange them in soldierly rows. We are able to record that the lighting fittings did not resemble a forest, which regrettably is often the case.

The public who come to pay their bills pass through this fascinating display, and find themselves at the large horseshoe counter of the main office. Here, too, literature may be selected from a variety laid out on a large table. The offices are furnished in mahogany, in style as sumptuous as the showroom. Besides stores and strongroom accommodation in the basement, appliances for hire are set out there for inspection by intending users.

The first floor is approached by a marble staircase leading out of the showroom, and provides a large lecture and demonstration hall, Directors' and Board room, and rooms for the Engineer and the Secretary and their staffs. The rear portion of this floor is devoted to a drawing office and to staff rooms, with the caretaker's quarters on the second floor.

THE LONDON ROAD SHOWROOM.

Through the good offices of the Secretary, the writer was later in the day able to visit the new branch showroom in London Road. This has just been opened, and has been designed to demonstrate the various uses of gas, rather than for the display of fittings and appliances. Thus the staff are able to show, for instance, a gas iron and board fitted ready for work, and the "Nautilus" flue for gas-fires actually functioning. There is a complete kitchen recess, with cooker (in this case a Wright's "New Eureka"), destructor, and fire, and a "B.T.U." circulator. The latter is connected up to a handsome bath, which is also supplied from the latest type of Davis geyser. A most attractive "Rubstone" inset fire and hearth, with oak mantel (by the Davis Company) was on show, and an example or two of the best practice in each line of gas-consuming appliances.

Beyond a partition at the end of the room are examples of appliances for hire; and there is a useful little store and yard accommodation. The utmost has been made of small premises; and the Company are to be congratulated upon this enterprise, which is already justifying itself.

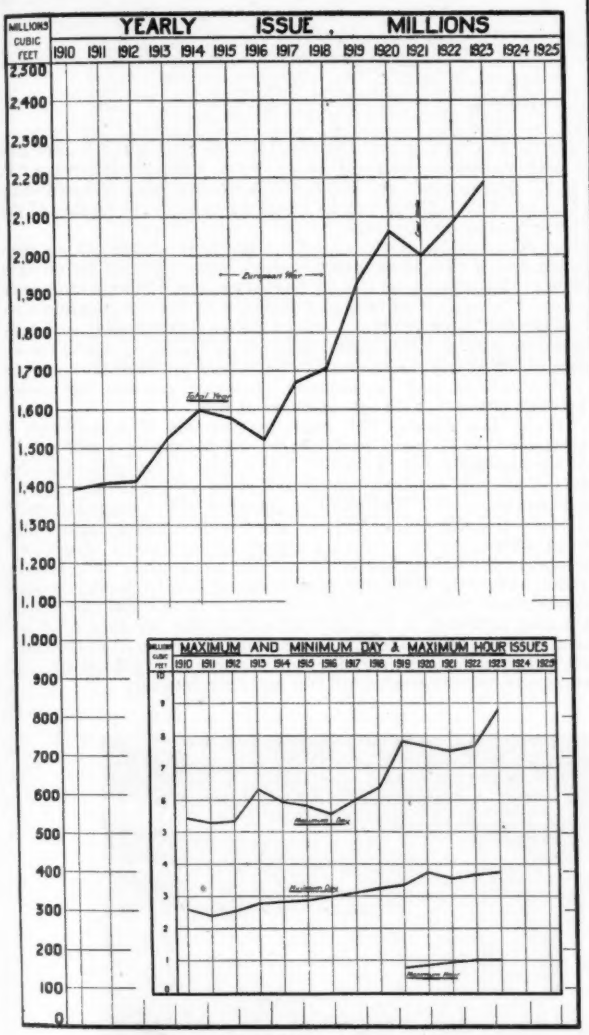
THE WORKS.

From the offices, the visitors were conveyed by motors to the Hilsea Works of the Company, and found much to engross their attention. For the majority, interest had been roused long ago by the able and exhaustive papers submitted to the Association by Mr. Carmichael and his Chief Assistant, Mr. Whitehead [see "JOURNAL," Vol. 160, p. 551, and Vol. 165, p. 780, respectively]. Much comment was passed on the freedom of the site and on "the eye to the future" that had been kept on the original lay-out. As items in which the greatest interest was taken we should select the Woodall-Duckham verticals, with the projected exten-

sions, and waste-heat boiler, with its careful lagging; the "G.N." coke transporter in the horizontal house—we remarked the addition of a spider, revolved by electric motor on the carriage, for the purpose of breaking the coke cake as it slides on to the quenching table; and the 2-million four-lift holder in course of erection by Messrs. R. & J. Dempster. We learn that the inner lift of this new holder will give a pressure of 5 in., and that the weight of the tank is 375 tons and of the whole holder about 400 tons. Bad weather has handicapped the erectors; but the work is now being pushed on rapidly—the tank and three of the lifts growing simultaneously.

The following information as to this and the other stations of the Company is taken from a brochure prepared for the occasion.

The Portsea Island Company dates from the early days of gas lighting, having been incorporated in the year 1821, and that in the evening of Saturday, June 9, in the same year, gas lighting was first used in the district of Portsea, then the principal business centre of the Island.



Growth of the Undertaking from 1910 to 1923.

The growth of the undertaking is exhibited in the following table:

Year.	Total Gas Made, C.Ft.	Price per 1000 C.Ft.
		s. d.
1890	584,341,000	2 4
1895	699,530,000	2 4
1900	928,888,000	2 4
1905	1,288,297,000	2 4
1910	1,395,301,000	2 4
1915	1,577,593,000	2 4
1920	2,066,170,000	4 6 and 4s. 10d.
1923	2,190,754,000	8·2d. per therm = 3s. 0·9d. per 1000 c.ft.

Gas has been sold on a heat-unit basis since June, 1921. The declared calorific value is 450 B.Th.U., and the present price 8·2d. per therm.

HILSEA WORKS.

The Hilsea Station covers an area of nearly 32 acres, and adjoins the Southern Railway Company's main line, from which sidings are taken to the works, which were erected in 1905 and extended in 1920. The original lay-out of the works provides every facility for economical extension, and full advantage has been taken of this in connection with the recent work. The roads immediately inside have been reconstructed in reinforced concrete and granite setts, as also has the length of road approaching the works, for which the Gas Company are responsible. This road and the works yard are illuminated by Sugg's "Littleton" lamps, fitted with pressure-valve control from the governor house.

Coal Stores and Handling Plant.—The stores have a capacity of 15,000 tons, and are adjacent to the retort house. The sidings encircle three sides of the works, and by this means coal is shunted from the main line and distributed to the various retort houses and stores. In the case of the horizontal retort house, coal is unloaded directly from wagons into a hopper feeding the breakers, and is thence transferred by dredger elevators and push-plate conveyors (built by the New Conveyor Company) to the continuous hoppers feeding the stoking machines. The vertical retort house is served by Babcock and Wilcox's rotary wagon tippler (capable of dealing with coal wagons having a maximum capacity of 12 tons net), coal breaker, automatic filler, and gravity bucket conveyor, each having a capacity of 50 tons an hour.

Horizontal Retort House.—This comprises twenty beds of tens, by Messrs. Gibbons Bros., in two ranges of ten settings each. One range was put to work in Nov., 1923; the other ten beds are at present being rebuilt; and when the latter reconstruction is completed, the total capacity of the house will be 2¾ million c.ft. per diem. The stoking machinery is electrically driven and comprises a Drake's combined machine and a Fiddes-Aldridge simultaneous machine. The retorts are only 17 ft. 4 in. long, owing to the fact that the original benches were of inclined retorts. On the discharging side the coke is handled by means of a "G.N." hot-coke transporter, whereby it is transferred to a quenching bench. After quenching it is dropped into skips and removed by telpher.

Vertical Retort House.—Immediately to the north of the horizontal house is an installation of seven beds of Woodall-Duckham verticals in a steel-framed house, which is at present being extended by the addition of a further seven beds and the suitable enlargement of the house. Provision was made in the erection of the original vertical bench to facilitate the present extension. The complete house of fourteen beds will be arranged on the telpher track as centre line. The retorts and combustion chambers are being constructed in best-quality silica material for a depth of 17 ft.; and the capacity of the new bench will be 2¼ million c.ft. per diem, that of the whole house 4 millions. A second gravity bucket conveyor will be installed to serve the new beds, and each will be made to act as a stand-by for the other, by the provision of a reversible cross belt conveyor above the hopper level. An electric lift gives access to the various floors. The coal handling plant is electrically operated; and the extractors are driven by small gas engines, which were put in of sufficient power to serve the complete 14 beds. A waste-heat boiler, with fan driven by a high-speed steam engine, has been installed on a raised platform, and this will be duplicated in the case of the new installation. It is capable, when all retorts are working, of raising 2600 lbs. of steam per hour at a throughput per retort of 4·11 tons of coal per day.

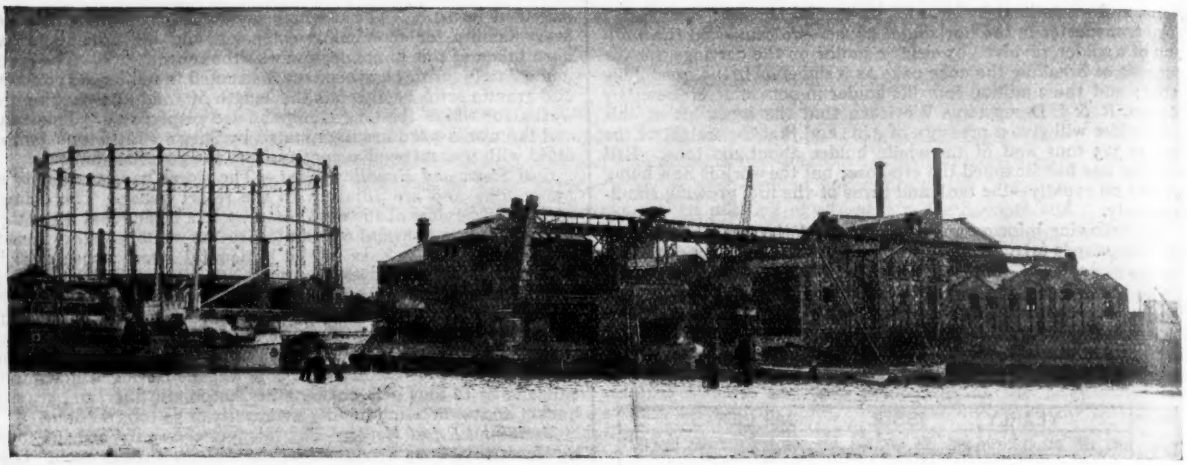
Telpher Plant.—The monorail electric telpher plant is by Messrs. Strachan and Henshaw. The height of the track is 52 ft. above datum, and the lifting capacity of the machine 3 tons gross load at 60 ft. per minute, with a travelling speed of 500 ft. per minute. The plant is so laid out that it will deal with coke from both retort houses, transferring it into the yard or into either of two sets of ferro-concrete bunkers, while screened coke can be taken to steel hoppers over the water gas plant and breeze to smaller bunkers above the main boiler house. Both sets of concrete hoppers are provided with screens at the discharge shoots. The skips are bottom-opening, each of about 145 c.ft. capacity, and are mounted on roller bearings.

A "Columbus" (type C) waste fuel recovery plant has been erected on the centre line of the telpher track, and is of sufficient capacity to deal with ashes from both Hilsea and Flathouse Works, the latter being transported by steam wagons. [A plan and elevation of this plant were given on p. 784 of Vol. 165 of the "JOURNAL."]

Power House, Exhausters, &c.—The former contains three exhausters direct-coupled to horizontal steam engines, by Messrs. Bryan Donkin & Co. The centre exhauster is of a capacity of 300,000 c.ft. and the other two of 125,000 c.ft. per hour each. The power house further contains an 88-B.H.P. vertical compound steam engine, by Messrs. Browett, Lindley & Co., direct coupled to a generator by the Lancashire Dynamo Company. The capacity of this set is 58 KW. (440 volts) at 600 r.p.m. Working in parallel with this are two gas-engine driven dynamos of the same make and capacity, the gas engines (each of 95 max. B.H.P.) being of the horizontal type by the National Gas Engine Company.

The electric motors throughout the works are of the totally-enclosed compound-wound type, operating upon direct current of 440 volts.

In the same block of buildings as the power house and adjacent to it, is the water tower, built over a well 75 ft. deep by 6 ft. dia. The ground floor contains a "Deane" pump capable of lifting 20,000 gallons of water per hour from a depth of 65 ft., delivering into an overhead storage tank 60 ft. high. The higher floors of the tower support various water and liquor tanks and the telpher repair shop. Adjacent to the tower is the pump house (roofed by



FLATHOUSE GAS-WORKS.

the boiler-feed tank) containing duplicate tar, liquor, and boiler-feed pumps, feed-water heater, and a "Permutit" water-softening plant, capable of softening 75,000 gallons a day in three 8-hour cycles. The "Permutit" process consists simply in passing the hard water through a cylindrical filter filled with "Permutit," which possesses the property of chemically absorbing lime and magnesia from the water, and of afterwards giving up these impurities again when acted upon by a solution of ordinary salt. A completely softened water is obtained, and the softening is automatically effected without any of the inconveniences attaching to older methods.

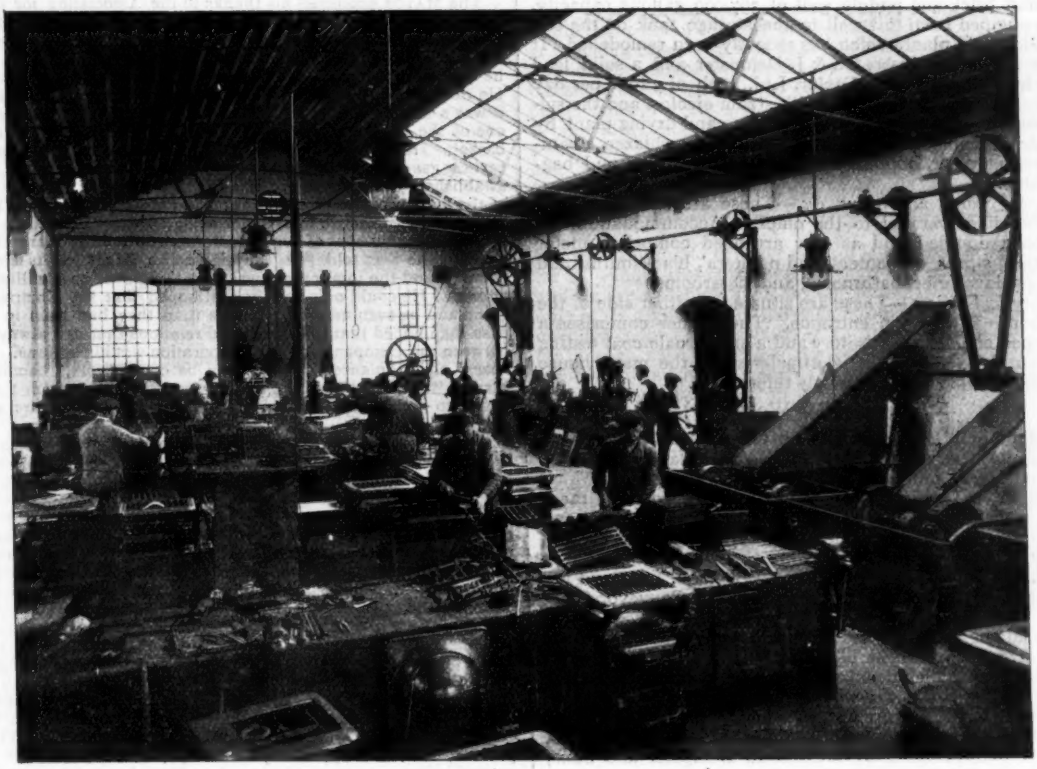
Boilers.—The main house is situated next to the pump house, and contains four Lancashire boilers 8 ft. dia. by 30 ft. long, fitted with Sugden superheaters and with forced-draught furnaces of various types. There are two Wilton furnaces, one "Turbine" furnace and one by Messrs. Meldrums, Ltd. Other boilers in various parts of the works comprise the waste-heat boilers on the vertical retorts and the water gas plant, a Lancashire boiler in the horizontal retort house, and two Cornish boilers in the sulphate of ammonia works. The last three boilers are kept in reserve.

Condensers, Tar Extractors, and Washers.—The coal gas plant, from retort houses to the inlet to purifiers, is arranged in two sections, so that either house may be isolated at will for testing purposes. The connections are so arranged that each section may be used with either pair of exhausters; and the first section contains water-tube condensers of 2½ million c.ft. per day capacity, a Livesey washer of the same capacity, and two rotary washer-scrubbers, all by Messrs. Clapham Bros. The second section, erected during the last four years, is of 3 million c.ft. per day capacity, and comprises Holmes' water tube condensers, a "P. & A." tar extractor, and tar and liquor separator—the last two by Messrs. R. & J. Dempster, Ltd.—and a centrifugal washer of the Davidson-Liversedge type.

Purifiers.—The original coal-gas purifiers comprised six dry-luted boxes, 36 ft. square by 6 ft. deep, arranged in threes on each side of the oxide shed; there being an exactly similar set for water gas. Two additional boxes, 36 ft. by 41 ft. have been added during the last three years to the coal-gas section, together with concrete revivifying floor, electrically driven transporter, and travelling disintegrator. Connections have been put in so that coal gas and water-gas may be admixed, or either gas may be passed through either or both sets of boxes at will.

Water Gas Plant.—This contains two sets of Humphreys & Glasgow C.W.G. plant, each capable of producing 1 million c.ft. of carburetted gas in 24 hours. The telpher plant brings the coke to the storage bunkers, which are fitted with cascade screens, breeze shoots, &c. The plant is complete with exhausters, relief holder, oil storage tank, &c., and a waste-heat boiler has recently been added, together with oil separator, feed-water heater and pumps in the blower house. The boiler connections have been so arranged that the blow gases from both sets may be passed through it when carburetted gas is being made. The usual method of working, however, is to gasify the oil on one set only, in which case both the blast products and the blue water gas from the other set will pass through the boiler, which works at 125 lbs. per sq. in. and generates sufficient steam for one complete set.

METER SHOP, RUDMORE.



STOVE SHOP, RUDMORE.

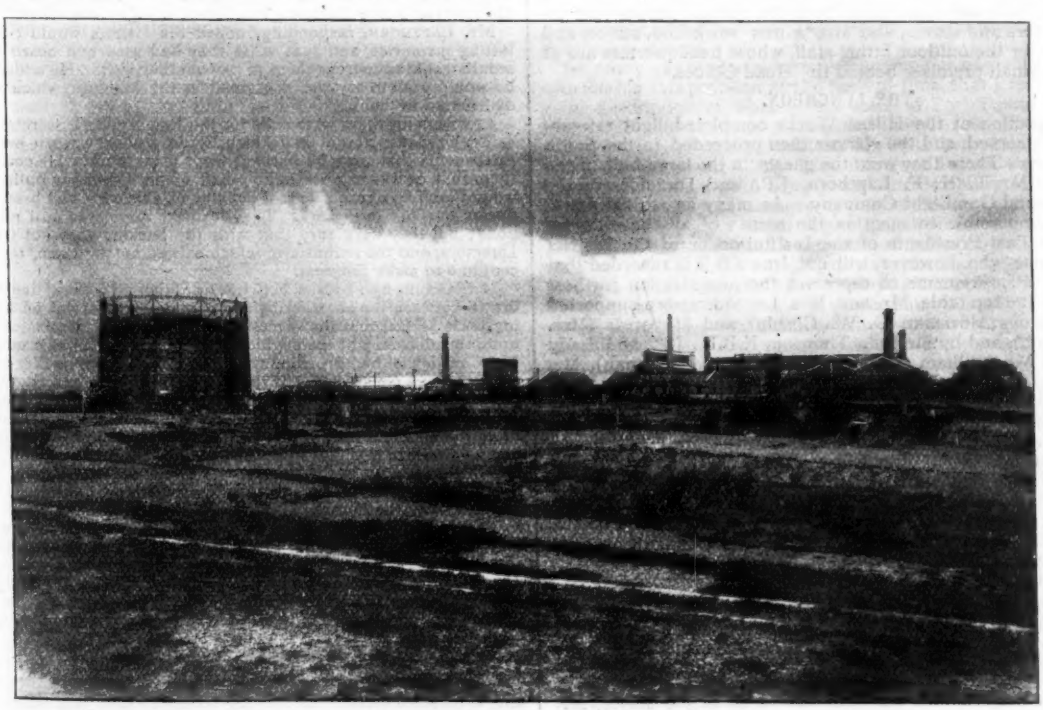
Station Meters—Of these there are three by Messrs. J. & J. Braddock, of Oldham, each capable of passing 3 million c.ft. of gas per day. Foundations have been laid down for a fourth meter, but are utilized for a set of four sample holders, each of 120 c.ft. capacity.

Naphthalene Washer.—A rotary washer of the brush type has recently been erected by Messrs. W. C. Holmes & Co., Ltd. This has been connected up at the inlet to the holders, and serves to eliminate the naphthalene from 5 million c.ft. per diem.

Gasholders.—The existing holder, a 4-lift column-guided one of a total capacity of 3,083,000 c.ft., in a brick-and-puddle tank, was constructed twenty years ago by Messrs. C. & W. Walker, Ltd. The diameter of the tank is 188 ft., and the over-all height of the guide-framing 140 ft., the pressure of the four lifts being 10 in. water gauge. Immediately to the south a second holder is now in course of erection by Messrs. R. & J. Dempster. This is a 4-lift spiral-guided holder in steel tank of a total capacity of 2 million c.ft. The tank, which is 159 ft. 3 in. in dia. and 30 ft. 6 in. deep, rests on a slab of reinforced concrete 10 ft. below ground-level. The holder when full will reach the same height as the guide-framing of the existing holder.

Governors, Boosters, &c.—There are two station governors of the Braddock double-cone type, 30 in. and 15 in. respectively. (Other governors, five in all, are accommodated at Rudmore and Flathouse.) The boosters comprise two Keith-Blackman open-type fans, driven by De Laval turbines, each set having a capacity of 500,000 c.ft. of gas per hour at a differential pressure of 12 in. of water. The governor house also contains a small steam-driven Brotherhood compressor for working the paraffin atomizers, and a screened portion at the end accommodates recording calorimeters, CO_2, and specific gravity recorders, &c. Three "Widlake" distance pressure indicators are also fitted, showing the pressure at the extreme ends of the district of supply.

Sulphate of Ammonia Plant.—The main liquor storage is an



HILSEA GAS-WORKS.

underground brick-and-puddle well of 397,000 gallons capacity. Liquor is pumped from this well to the storage tank on the sulphate of ammonia plant, which has recently been remodelled. It comprises a still by Messrs. R. & J. Dempster and a solid lead saturator by Messrs. Joseph Taylor, Ltd., both of 5 tons per day capacity. The saturator is fitted with steam ejector, and the sulphate is then passed through a neutralizing and drying plant by the Chemical Engineering Company, comprising whizzer, steam-heated drier, elevator, hopper, and automatic weighing and bagging machine.

Workshops, Stores, Messrooms, &c.—These are contained in a block of buildings parallel to the offices. Accommodation has recently been doubled, and as now arranged comprises meter house, general stores, carpenters' and painters', blacksmiths' and fitters' shops, lavatories, bathrooms, and messrooms.

Laboratory and Offices.—These are situated on either side of the governor house at the main entrance. The former comprises a fully-equipped chemical laboratory and a small-scale coal testing plant. There is in addition a calorimeter set in the meter house alongside the sample holders already referred to.

FLATHOUSE GAS-WORKS.

This station, built in 1834, covers an area of a little over three acres. The site is between H.M. Dockyard and Flathouse Wharf. The total output is 4 million c.ft. of gas per 24 hours, of which 2·5 millions is coal gas. As no railway siding exists at these works, the coal is brought by ship from the Durham fields and unloaded by a 5¾-ton steam crane and grab, and is thereafter distributed by a band conveyor travelling the whole length of the works. The crane is by Messrs. Cowan Sheldon. Ltd., and the elevators and conveyors throughout by the New Conveyor Company.

The carbonizing plant consists of ten beds of Woodall-Duckham vertical retorts, in two ranges of five, together with nine beds of horizontals at present shut down for reconstruction. There are also two C.W.G. plants of 1 million c.ft. a day capacity each. Coal is elevated to both retort houses with dredger-type elevators and distributed by band conveyors. The coke is handled by a 2-ton telpher plant, erected by Messrs. R. Dempster and Sons, which serves to distribute it to the coke yard or into concrete hoppers, and is also arranged to feed the main boiler house. At this station there is one gasholder with a capacity of 1½ million c.ft.

RUDMORE WORKS.

This station comprises boosting and governor house, a gasholder, and stove and meter shops; no gas being manufactured. The holder is of 1½ millions capacity, and is fed at will from either Hilsea or Flathouse. The governor house contains four station governors, together with two sets of steam-driven exhausters. There is also a rateau booster by Messrs. Bryan Donkin & Co., of 500,000 c.ft. per hour capacity against a differential pressure of 15 in. It is driven at 2000 r.p.m. by a 35 B.H.P. Brotherhood turbine.

Stove and Meter Shops.—These are fully equipped with the necessary plant and facilities for the repair and testing of dry and wet meters, and for the cleaning and repairing of cookers, gas-fires, and other appliances. The buildings, which also comprise a large stove store, smithy, general stores, messroom, &c., are in process of reconstruction, and will be more than double their present size when completed. The main object of the extensions is to provide more accommodation both for general stores and returned meters and stoves, and also a new workshop, stores, and messroom for the outdoor fitting staff, whose headquarters are at present in small premises behind the Head Offices.

THE LUNCHEON.

The inspection of the Hilsea Works completed, light refreshments were served, and the visitors then proceeded to the South Parade Pier. There they were the guests, in the large hall, of the Chairman (Mr. T. H. F. Lapthorn, J.P.) and Directors of the Portsea Island Gas Light Company. As many as 240 sat down, and it is impossible to mention the names of all those distinguished as Past-Presidents of the Institution or of the District Associations—who, however, will not frown if it is recorded that Mr. J. W. M'Lusky came to represent the organization furthest north. At the top table, Mr. and Mrs. Lapthorn were supported by the Mayor (Alderman G. W. Corbin) and Mayoress (Mrs. A. G. Corbin), and by Sir John Timpson, K.B.E., J.P., and Lady Timpson. Mr. William Gillman, J.P. (Deputy Chairman), Mr. and Mrs. J. W. Gieve, Councillor F. Beddow, D.Sc., and Mr. and Mrs. W. Doig Gibb represented the Board of the Company. Also at the top table were Sir John Hindley, Alderman Power, Mr. and Mrs. St. Barbe Emmott, Miss Turner, Mr. F. J. Sparks (the Town Clerk), Mr. Philip Ellis, and Mr. L. J. Langford, Mr. P. G. G. Moon, Mr. W. M. Mason, and Mr. W. H. Bennett. The Chairman announced apologies for absence from the Mayor-Elect, Mr. J. Ferguson Bell (President of the Institution), Mr. W. J. Smith (Secretary of the National Gas Council), and Sir Arthur Duckham.

After the Loyal Toast,

The CHAIRMAN gave "Our Guests." He was glad that Portsmouth had been able to show them that day that they did not deserve the title usually applied by the people of the north—that of the "Sleepy South." He hoped that some of visitors at least would leave the town feeling that they had seen something which was worth their while to inspect. He coupled with the toast the names of the Mayor, Mr. Langford, and Mr. Mason.

The MAYOR expressed his thanks to the Association for the opportunity to be present at their gathering, and also to the Chairman and Directors of the Portsea Island Company for their hospitality. He had often thought he would like to look over the gas-works, but what he had seen was a good deal different from what he had expected. He thought he was going to see dull gloomy works; but instead of that it was a bright place, with flowers and plants growing around, and in one of the engine rooms he noticed a plant growing in a hanging basket. He understood that the Portsea Company was one of the earliest gas manufacturing concerns in the country, for it had been established over 100 years. It was still considered, and rightly so, one of the most progressive concerns; and notwithstanding the keen competition of the electric light undertaking (which belonged to the Corporation) the number of consumers was continually increasing. The concern, he was told, was the eighteenth largest of its kind in the country, and the total output was something over 2000 million c.ft. per annum. He could only say they all hoped that the Company would go on and be even more prosperous than they had been in the past. Also they hoped that the same good relations that had always existed between the Company and the Corporation would continue. ["Hear, hear," and applause.] "We may be competitors," concluded the Mayor, "but we might just as well be friends as not. I think we ought to endeavour to help one another; and there are ways and means of doing it."

Mr. LANGFORD (President of the Association), who was enthusiastically received, thanked the Chairman and his Co-Directors for the very active interest they had taken in the Association. The Portsmouth Company stood for progress and efficiency, and the work they had carried out during the past few years in all matters connected with the economical carbonization of coal aroused the whole-hearted admiration of those engaged in the gas industry. This work was reflected in the exceptionally low figure at which the Company were supplying gas to their consumers—namely, 3s. 9d. per 1000 c.ft., or barely 7d. more than the pre-war figure. Portsmouth might well be proud of its Gas Company, particularly when the distance between the town and the coalfields was considered. Mr. Langford went on to allude to the broad-minded and generous spirit pervading the Company, not only in regard to the Association, but also in connection with the gas industry in general, which had been given the benefit of their experiments and experiences through the most able papers given by their Chief Engineer, Mr. Carmichael, and his assistant, Mr. Whitehead. ["Hear, hear," and applause.] These papers were intensely interesting and instructive, containing as they did a fund of highly technical information together with carefully tabulated results and costs, and he took the opportunity of again acknowledging the great indebtedness of the industry to Messrs. Carmichael and Whitehead and the Company for disseminating the result of such excellent research work. Commenting on the visit to the works, Mr. Langford said there could be no question that visits such as this must enormously assist the industry of which they were so rightly proud. This fact was brought home to them that day, as they could not fail to grasp fresh ideas from the Portsmouth Undertaking for the solution of difficulties and problems in their own undertakings. Finally, in expressing appreciation of the hospitality, the President remarked that the happiness of the day had been increased considerably by the presence of the ladies.

Mr. W. M. MASON (Manager of the "B.C.G.A.") also replied—in his usual inimitable style.

Mr. P. G. G. MOON (the President-Elect) proposed "The Portsea Island Gas Light Company," coupling with the toast the name of the Chairman. The Company stood for efficiency, and it was right in the forefront of the industry. It led the way in new methods, and it was served by a far-seeing Board of Directors, and on the technical side by colleagues of whom they (the Association) were proud. So far as the works were concerned, the thing which had struck him was the way in which the future had been thought of in planning for the present. He referred to the Company's excellent work on the district.

Mr. LAPTHORN, responding, hoped the visitors would carry away lasting memories, and that what they had seen and heard in Portsmouth would encourage them to pay another visit. He added that all he would wish to say was contained in the brochure which had been distributed to them.

At this point there were calls for the Engineer and Secretary.

Mr. T. CARMICHAEL, M.I.Mech.E., in a short speech emphasized the benefits that may be derived from team work. He could assure them that every member of the staff of his Company pulled his full weight, and as a result a great amount of efficiency had been attained during the last few years. They realized there was still more to be done; but they were sure that with the backing they got from their Directors, and the enthusiasm which existed among them, they would continue to make progress.

Mr. HERBERT A. STIBBS, F.C.I.S., said that no definite line could be drawn between the engineering and commercial sides of an undertaking. He agreed that the success of an undertaking depended largely upon the efficiency of the engineering section, and in this connection Mr. Carmichael had provided them gas of a uniform quality and pressure, and at a cheap cost. If they on the sales side had not made any use of that fact, then there must be something wrong with their side of the organization. He thought, however, they had not neglected entirely the opportunities which Mr. Carmichael had presented to them; he could tell them that during the last two years the quantity of gas sold in Portsmouth has increased by between 20 and 25 p.ct., and the number of appliances had increased by something like 16,000. They had increased the number of gas fires in use in Portsmouth by 12,000, so he thought it would be seen that they had not been idle on the selling side of the concern. So far as the future of the industry was concerned, he thought they would agree with him that the outlook had never been brighter or so full of promise. ["Hear, hear."] The only condition was that they must make full use of the greater opportunities afforded every day to extend the use of gas for domestic and industrial purposes.

BUSINESS MEETING.

After luncheon there was a private joint meeting of the Eastern and Western Districts of the Association; and thereafter a visit was paid to the Company's meter and stove works at Rudmore

(described in the brochure, *vide supra*). Much was to be seen of interest; and Mr. Redwood, the Works Manager, earned the thanks of all for his eagerness to help the visitors with demonstration and explanation.

Meanwhile, the ladies of the party and non-members of the Association had been making a delightful trip round H.M. Dockyard, in the course of which they visited H.M.S. *Victory* (Nelson's old flagship) and H.M.S. *Warspite*, a fine example of the modern fighting unit.

By 5 p.m. all had foregathered once more at the Chief Offices of the Company, where tea was served and the opportunity taken of thanking those who had done so much to make a brilliant success of the occasion. Primarily the indebtedness was to Mr. Carmichael, Mr. Stibbs, and the Assistant Engineer, Mr. Whitehead; but the whole staff contributed to that end, especially the Works Managers, Messrs. Marwick, Mills, Garward, and Redwood, and their Assistants, Messrs. Connolly, Brothers, Lilley, and Nicholson, and Mr. Stewart (Accountant) and Mr. Cassell (Chief Clerk).

PORT TALBOT CORPORATION GAS AND ELECTRICITY.

By A. J. BOND, Gas Engineer and Manager, Aberavon.

The combination of gas and electricity is still proceeding, and is apparently getting a firm hold with advanced engineers in many parts of the country. First Crowborough, Swanage, and Oakham, and now Port Talbot, with a number of others coming on.

Mr. Hugh Seabrook, who has designed our electrical system, has frequently referred to the savings to be effected by the combination of gas and electricity in small towns and villages; but personally I would go very much further than this, and say definitely that combining the production of gas and electricity in one works offers enormous savings as compared with separate organizations, even in the largest towns and cities. In the small places, the combination is essential, if it is desired to obtain the lowest costs of operation for both businesses. In the large towns, the concentration of gas and electricity production on one site offers immense advantages over separation; site and buildings are cheaper, and electricity can be produced by the utilization of carbonized coal for burning under the boilers, supplemented where necessary (as would be the case in most large towns) by raw coal, but coal selected on account of its low value from a bye-product point of view. In this way, an enormous increase would be available of coal and bye-products; and selecting the most suitable coals for carbonizing and direct burning would result in a better use of raw coal stocks than is possible under the present haphazard system, by which coal suitable for carbonization is consumed under boilers, and gas undertakings in some cases are forced to use for carbonizing coal that is not so suitable for bye-product recovery.

The Corporation of Port Talbot, being convinced of the economies to be effected by running their new electricity supply undertaking in conjunction with their gas undertaking, recently placed tenders for a complete electrical supply system, consisting of plant, mains, and transformers. The main power station contract was placed with the General Electric Company, and consists of a 100 KW. and two 250 KW. three-phase alternators, driven by "Premier" horizontal gas engines to be fed with town gas. The generating pressure for the time being is to be 250 volts phases to neutral. Local feeders are supplied direct, and the pressure stepped-up to 2500 volts for the two town feeders, one terminating at the Town Hall and the other at the old Margam Council Offices.

Low-pressure generation was decided upon on account of safety and simplicity, our men already being accustomed to a low-pressure electrical system which we have employed for some time for driving the retort charging machinery. As the undertaking increases in size, doubtless generation will be effected at 2500 volts phases to neutral, but by that time the undertaking will be able to afford a regular running staff, whereas, in order to keep down expenses in the early stages, I am desirous of making as much use as I possibly can of my present staff, who operate the electrical and other machinery of the works. The station is so laid out that new plant can conveniently generate at the higher pressure.

The travelling crane arrangement is rather unusual, in that the crane bed and rails are supported on stanchions independent of the building. The "G.E.C." contract including this enables us to let a separate independent contract for the building, which will be only a shell; but doubtless we shall tie the walls of the building to the crane stanchions. Owing to the infrequent use of it, a hand operated single girder 10-ton crane is being installed, and not a mechanically driven one. A small converting set is included, which will convert three-phase current to direct current for our retort-house stoking machinery. This will enable us to shut-down the present electrical generating steam-driven set which we have used hitherto.

A feature of the gas engines which has been found to reduce gas consumption very materially is a series of valves that will enable one or more cylinders to be cut out and in, according to the load on the set. A system of controlling these valves automatically by electrical apparatus has been patented, and it is intended to fit this apparatus on to our 100-KW. set as a trial. The importance of this will be realized when I point out that the guaranted gas consumption, with all cylinders working, of our 100-KW. set is 0·355 therm per unit at quarter load, and 0·212 therm at half load, whereas with the cylinder control it is estimated that this can be reduced to 0·205 therm at quarter load and 0·18 therm at half load. The importance of this is further illustrated by the gas consumption at full speed—fully excited, but no load—which, with all cylinders working, is 7·95 therms per hour, but with automatic cylinder control is reduced to 4·46 therms. So far as I know, this is the first application of apparatus of this kind, and we are watching its behaviour with very great interest. The only other appliances in the engine room will be the starting and cylinder-cooling plant, which sets will be in duplicate; the main set in each case being a motor-driven plant. The duplicate of each will be a town gas engine driven plant. We have plenty of cooling water available, so that only circulating pumps are required.

The contract price of the plant, complete with switchboard, motor generator, crane, and everything, including foundations and buildings, works out at under £23 per KW. For such a small plant we feel this is satisfactory. The contract for the mains work has been placed with the Pirelli-General Cable Works, Ltd., of Southampton; and for the transformers, with the Foster Engineering Company, Ltd., of Wimbledon. The town feeders are stepped-up to 2500 volts phases to neutral by transformers to be fixed outside the engine room in the open air, against the north wall. The step-up transformers will be controlled from the low-tension feeder panels on the switchboard, and there will be no other control gear between the main switch and the high-tension side of the transformers—the method being what is known technically as the "tied in" system. All the transformers, step-up and step-down, are single phase transformers, whether to be used for three-phase or one-phase circuits. This incidentally reduces the number of spares, and, what is more important in our case, the transformers are interchangeable for our single-phase extensions to the outskirts of the district. With the exception of the town, very little three-phase current will be required, and we propose to make our extensions from the central system single-phase supplies. The Town Hall and Margam sub-stations will consist of single-phase transformers connected up as three (all transformers standing outdoors), and a simple control apparatus fixed in a convenient cellar, which exists in each case. The Margam feeder follows the same route as the Town Hall feeder as far as the Town Hall, and an inter-connection is provided for, so that up to the Town Hall the feeders are in duplicate.

The high-tension cable system is all three-phase four-wire, the neutral being of the same sectional area as the phase conductors. The pressure is 2500 volts phases to neutral. The low-tension system is similar—four-wire three-phase, 250 volts phases to neutral. All transformers, step-up and step-down, are provided with a tapping switch, which has been carefully selected, also a voltmeter and ammeter; the whole of the gear being contained in a chamber immediately above and attached to the transformer case. This arrangement gives us an extreme flexibility on the distributing side, which I have been particularly anxious about, because my experience in the Gas Department indicates how convenient it is to have a means of varying pressure independent of the main generating station.

So many gas undertakings, both company and municipal, are considering this problem at the present time, that I trust the foregoing description of what we are doing at Port Talbot will be of interest to your readers. One point I might refer to is that most gas undertakings using electricity for their own purposes instal a "D.C." system. In a large area like Port Talbot, this would not be suitable for a public supply, and the flexibility of the "A.C." system has many advantages as regards cheap and economical variation in pressure according to the distances we have to run. The "D.C." system has an economical radius of not more than a mile or two. "A.C." entails running plant 24 hours a day; but on a gas-works we have men employed continuously throughout the year, so that this does not present any difficulty. The generating plant being what one may call "two-thirds a gas-man's job," the running of gas engines for electricity supply should not present any greater difficulty than running gas engines for use in the works. The same men can look after them all.

Sutton's "Volumetric Analysis."—The Eleventh Edition of Sutton's "Volumetric Analysis" has been published by Messrs. J. & A. Churchill. In its new form it is revised throughout, and contains numerous additions. The section dealing with gas analysis has been contributed by H. Hollings, M.Sc., A.I.C., and J. S. G. Thomas, D.Sc., A.R.C.Sc., A.I.C.

Gas Companies' Protection Association.—The twenty-seventh annual general meeting of the Association will be held in Caxton Hall, Westminster, on Thursday, Oct. 30, at 3 o'clock, for the purpose of receiving the report of the proceedings and the accounts and balance-sheet for the year ended Sept. 30, for the election of officers, &c. The re-election of Sir J. Fortescue Flannery, Bart., as President, and of Messrs. H. E. Jones, Charles Hunt, and Reginald G. Clarry as Vice-Presidents, will be proposed.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

Opening Meeting and Anniversary Dinner.

The Opening Meeting of the Twenty-First Session of the Scottish Junior Gas Association (Eastern District) was held in Windsor House, Hillside Crescent, Edinburgh, last Saturday. There was a very large attendance—about 45 members. This included many old members.

Mr. D. D. Bruce (East Wemyss), the retiring President, occupied the chair, and was supported by Mr. W. R. Herring, M.Inst.C.E., Mr. J. J. Scott (Cowdenbeath), and Mr. John M'Isaac and Mr. John Murray (President and Hon. Secretary respectively of the Western District). Mr. Bruce welcomed the members and the representatives of the Western District, and thanked the Association for its loyal support.

Mr. E. L. Farquhar (Lower Largo), the Hon. Secretary and Treasurer, reported that he had received apologies for absence from Messrs. Jas. Campbell (Dunfermline), Samuel Milne (Aberdeen), W. B. M'Lusky (Halifax), Henry Rule (Kelty), Alan Reid (Brechin), and J. D. Smith (Belfast). He added that these gentlemen had sent their heartiest best wishes to the Association on its twenty-first birthday.

Mr. Bruce then introduced Mr. R. L. Laing, of Brechin, the new President.

Mr. Laing, on taking over the chair, thanked the members for the honour they had bestowed upon him, and said that the attractive syllabus which had been arranged for the session augured successful meetings. He presented Mr. Bruce with a gold medal as a memento of his term of office. He then introduced Mr. W. R. Herring, and voiced the appreciation of the Eastern District at being honoured with an address from him.

THE SALIENT POINTS DOMINATING THE GAS INDUSTRY DURING THE LIFE OF THE SCOTTISH JUNIOR GAS ASSOCIATION.

By W. R. Herring, M.Inst.C.E.

When asked by your Council to address you upon this the twenty-first meeting of your Association, and being reminded that I had played some small part in its inauguration, I could not refrain from acceding to such a request—not only from a desire to help, but also as affording me considerable pleasure in meeting again many with whom I have lately lost touch.

I have found it difficult to compress into one short address the salient points that have dominated the industry during the whole period of your existence as an Association. Never has so much of importance affecting any industry transpired in so short a time, and with such persistent progress. At the beginning the industry was still a thrall to an unscientific system of testing for quality, which determined its manufacturing process and commercial policy; and at your "coming of age" a revolution has been achieved—if not in its manufacturing process, which remains for the juniors to accomplish, at least in the denomination of its principal product, the basis of its sale, and in its application to general use. In my view, the life of your Association has synchronized with perhaps the most important period that has occurred in the century of gas-lighting. Properly to appreciate this it will be necessary to review the conditions prevailing at its birth, and lightly to trace the tendency and movements of its controlling factors.

At the outset the controlling factor was the necessity of producing an illuminating gas, regardless of the purpose for which gas was used. Further, the illuminating-power standard bore no comparison to the test value of the gas and what the consumer obtained, as these varied to an enormous degree, primarily because the standard value was determined by a type of burner little, if at all, used by the general public. Thus the manufacturer was compelled to organize his operations so as to produce a product to respond to a test which in use bore no resemblance to what the consumer obtained. The long controversy arising out of testing for quality stands on record in every technical publication, and probably forms 50 p.ct. of the gas literature in the past. One of the most remarkable features brought out by the controversy was the discrepancy that crept in between the original prescription of what the test-burner should be as given in the Act of 1868, and what it ultimately was found to do when other than straight coal gas of a particular quality was manufactured.

The controversy at last became so clamant that in January, 1904, Parliament appointed a Committee to "inquire into and report as to the statutory requirements relating to the illuminating power and purity of gas supplied by the Metropolitan Companies, and the methods now adopted for testing; and whether any alterations are desirable in such requirements or methods, and, if so, whether any consequential alteration should be made in the standard price of gas." The Committee sat for 21 days, and the proceedings cover some 250 pages of printed matter. The report is dated May 19, 1904. The findings of this Committee were not altogether satisfactory to the gas industry. They recommended that the standard burner should be the same in the future as in the past, and that it should be used at the rate of consumption of 5 c.ft. per hour, notwithstanding the evidence that had been led to show that such a burner by such a method of use gave different results on gas of varying composition. They recognized that, while the incandescent burner rendered superior lighting, and was more generally used, the flat-flame burner was still of importance to many consumers. For the first time provision was made for the official testing of the illuminating power with a flat-flame burner, and for the calorific value—but for information, not as a penalty test. They further recommended that the industry should be relieved of the necessity to purify gas from sulphur impurities other than H_2S, and put forward other minor, but important, provisions. This report did not quell the controversy that had prevailed for so long, but on the contrary added new fuel to the fire.

In 1905 the London County Council and the City of London Authorities promoted a Bill in Parliament to give effect to the findings of Lord Rayleigh's Committee of the previous year. The Companies also jointly promoted a Bill having in view the same purpose, but not necessarily adopting the same points of view. There was considerable controversy before Parliamentary Committees, which resulted in the London Gas Act of 1905 becoming law. In this the wording of the clause defining the burner is given as follows:

> The Gas Referees shall from time to time prescribe the burner for testing the illuminating power of the gas, and the chimney, if any, to be used with such burner.
>
> The burner so prescribed shall be of such a pattern, not being an incandescent or similar burner, as shall be practicable for use by the consumers; and the burner and chimney (if any) shall be the most suitable for obtaining, and in making the test shall be so used as to obtain, from the gas when consumed at the rate of 5 c.ft. per hour the greatest amount of light.

Of immense importance, as the sequence will show, were the words with which the clause commences—viz., "The Gas Referees shall from time to time prescribe the burner for testing the illuminating power of the gas."

In 1906 Dr. Charles Carpenter communicated a paper to the Institution of Gas Engineers on the subject of the Argand burner; and perhaps I may also refer to a paper contributed by myself to the North British Association of Gas Managers in the same year, entitled "Illuminating Power and Lighting Efficiency." Dr. Carpenter contrasted the use of the London Argand burner on the same gas, but by different manipulation, causing a variation of as much as 2¼ candles. He also gave some results of testing by the burner devised by himself, which was directed to regulate the air supply to the character of the gas consumed. This seemed clearly to establish the important influence of air supply and its effect on the apparent illuminating power. In the same year the Gas Referees, acting upon the powers conferred upon them by the London Gas Act of 1905, prescribed a burner founded upon Dr. Carpenter's researches; and this became the test-burner in the London area from that date (1906), and gradually came into general use. The effect of the adoption of a more scientific test-burner upon the London Companies resulted in a considerable increase in the yield of gas per ton of coal, still of the prescribed illuminating power standard. The average make per ton in 1904 was 10,500 c.ft., and after the adoption of the No. 2 burner 11,500 c.ft.

In 1909 the Gas Light and Coke Company promoted a Bill in Parliament, and there was enacted in this Bill at the instigation of the London County Council, for the first time, a statutory test with penalties for calorific value as well as for illuminating power. At this date 125 calories net was accepted by all parties to be equivalent to 14 candles, when tested by the No. 2 Argand burner In 1912 the South Suburban and the Wandsworth Companies both promoted Bills in Parliament, and the question of imposing the calorific test naturally arose. I was instrumental in persuading certain local authorities to abandon their desire to impose penalty testing for both the illuminating as well as the calorific standards, assuring them that, so long as the calorific standard was about 540 to 550 B.Th.U. gross, there would be more than sufficient illumination when burning the gas in a flat-flame burner to serve every purpose for which it should be used. These Acts were the first two to establish the calorific standard as the only test of quality for domestic gas supply. Like all fundamental changes of this character, general adoption cannot be said to have been rapid; and but for the conditions arising out of the war, we might still have been in the early days of the general adoption of the calorific principle.

It is not necessary for me to refer to the conditions under which the gas supply of the country was carried on through the war years, or the important part it played in yielding the valuable constituents for the production of high explosives. This is fresh in all our memories, and has been placed on record in many different ways. The point which I wish to make clear is that it was these very conditions which forced the pace and compelled the acceptance of the calorific standard, to the lasting benefit of the consumer and to the advantage of the gas manufacturer. Incidentally the consumer at that time was enabled to appreciate the very considerable variations in the quality of the gas he got; and while in some cases undue advantage—probably through ignorance—was taken of the circumstances, on the principle that poor gas was better than no gas, at the same time it enabled those who were studying the question closely to come to something like a proper conclusion as to what was, and what was not, an economic quality to manufacture with the plant available. Also it was found that the calorific value of the gas, when totally stripped

of its illuminants, still yielded 95 p.ct. of its heating value. Advantage was taken of this in some cases to practise "over-exhaustion"—a term which you will all understand. This, however, was generally seen to be uneconomical; and the detrimental influence of non-combustible matter was quickly realized as a point of considerable economic importance not only on the works, but also with regard to the distribution plant and appliances. Those who had introduced water gas plants were in an enviable position, as they were able to produce gas from coke, almost free from non-combustible matter, of a calorific value of 300 B.Th.U., and use this as a diluent to a normal coal gas of 550 B.Th.U. If we accept the standard laid down by Parliament of 14 candle gas representing 550 B.Th.U. gross, it is easy to see that it is permissible to add 20 p.ct. of blue water gas to a normal 14 candle gas, and still supply gas of (say) 500 B.Th.U. calorific value.

Owing to war conditions, testing was abandoned for penalty purposes, though the records were duly kept in most works. To facilitate this an Act was passed—"Gas (Standard of Calorific Power) Act, 1916"—by which means the Board of Trade were empowered to grant Orders for the substitution of the candle test by the calorific test; and a large number of undertakings availed themselves of its provisions. The Orders issued were on a uniform basis of 500 B.Th.U. gross, in place of the prescribed number of candles.

The 1904 Committee also recommended that the industry should be released from the necessity of continuing purification by lime. At this date such a method of purification as is now general in the country—viz., the removal of H_2S by oxide of iron—was scarcely known in Scotland; lime being almost exclusively used, not so much for the removal of the sulphur compounds, but as a general practice. None the less it was of very great importance to the industry as a whole, as it not only minimized the quantity of plant required for the process, but also reduced the costs very considerably, and to a large extent eliminated the characteristic nuisance common to the process of purification.

In 1917 the Board of Trade, doubtless realizing the complexity of the gas question, and the conflicting opinions held by men whose views could not be brushed aside, asked the Fuel Research Board of the Department of Scientific and Industrial Research to advise as to "What is the most suitable composition and quality of gas, and the minimum pressure at which it should be generally supplied, having regard to the desirability of economy in the use of coal, and the adequate recovery of bye-products, and the purpose for which gas is now used." The Fuel Research Board, you will remember, was under the Directorship of the late Sir George Beilby.

The conditions arising out of the war inflicted a burden upon the gas and other industries, which the consumer had to bear, and also adversely affected the dividends of many gas companies, particularly those operating under sliding-scale provisions who had been recently before Parliament, and had had their standard or maximum prices adjusted to the conditions prevailing in the present century. Parliament considered this matter, and passed legislation—"Statutory Undertakings (Temporary Increase of Charges) Act, 1918"—giving some relief to those interested financially in such companies, but at the same time creating very important precedents for the future; for the effect of the legislation at that time was to entitle a gas company to charge such a price as would enable it to pay three-fourths of its standard rate of dividend on the ordinary stock—and this was made applicable to both sliding-scale and maximum-price companies. Obviously if a company may raise revenue sufficient to enable it to pay some dividend upon its ordinary stock, it automatically enacts the provision of sufficient revenue to pay interest on preference and all other prior charge stocks, so that it is not unreasonable to claim that the loan stock and preference stock of a gas company to-day are equal to a "gilt-edged security," as no doubt, given similar circumstances, Parliament would repeat in the future what it has already done in the past. For this reason it should be possible to finance gas undertakings on a lower scale of interest than has recently been the case; and it is to be hoped that it will influence the investor when he is fully informed upon the point, and thus enable companies to raise capital at a lower cost and employ a larger proportion of loan stock in relation to the ordinary capital. This is a matter of considerable importance to gas companies, and (while we are more concerned in this part of the world with municipalized supply) we may be called upon in the future to assist gas companies who desire to continue as such. For many years prior to the war the financial position of gas companies was such that it could scarcely be shown to be advantageous, except by taking a long view, for the public acquisition of a gas undertaking. Gas companies could finance themselves upon something under an average of a 5 p.ct. basis, whereas public authorities, when we add to the interest charges the amount required for sinking fund purposes, could not do much better, and therefore the transaction offered little or no immediate advantage to the consumer, though each year, as the debt is paid off, it brings the advantage nearer. To-day a local authority can finance such a transaction more cheaply than can a gas company.

Sir George Beilby's Committee reported finally in January, 1919, after many conferences with the respective interests concerned, at which both producers and consumers were duly represented and given every opportunity of discussing the investigations to be pursued, and also the draft report before its final presentation to the Board of Trade. The essential feature of this report was that the system of charging the consumer upon the thermal basis should be substituted for that of the volumetric basis. The other proposals that may be briefly summarized were:

> The calorific value of the gas to be continuously measured and recorded by a recording calorimeter.
>
> The gas manufacturer should be free to supply any mixture of combustible gases, &c.
>
> The gas manufacturer should be free to declare the calorific value of the gas which he will supply, subject to conditions as to burners, &c.
>
> That he should be at liberty to change the calorific value at any time, subject to being required to adjust and replace the burners in consumers' appliances if necessary.
>
> The minimum statutory pressure should be increased.

This brings us to the advent of the Gas Regulation Act, 1920, which was introduced to embody the leading principles which had formed the conclusion arrived at by the Fuel Research Board, and also to provide for the necessary adjustments in the financial provisions of the different undertakings due to circumstances arising out of the war. This Act provides for the substitution of the calorific basis of charge *in lieu* of the charge per 1000 c.ft., and incidentally stipulates that if any undertakers have not applied for an Order within two years of the passing of the Act (Aug. 4, 1920) the Board of Trade may impose the new obligations upon them. The Act also provides for financial adjustments in the following terms:

> The standard or maximum price per therm fixed by the Order shall be a price corresponding as nearly as may be to that fixed by those provisions for each 1000 c.ft., but with such additions as appear to the Board of Trade reasonably required in order to meet the increases (if any) due to circumstances beyond the control of, or which could not reasonably have been avoided by, the undertakers, which have occurred since June 30, 1914, in the costs and charges of and incidental to the production and supply of gas by the undertakers, &c.

There is provision for the revision of the standard price at any time on the application either of the undertakers or the consumers.

The next most important provision deals with the question of testing. Hitherto local authorities, though possessed of the necessary powers, were indifferent to, and in many cases negligent in, their use, so that it was not unusual even in large towns for the quality of the gas supplied to be unofficially recorded. In other words, a check on the weight of the goods delivered formed no systematic part of the local administration. Under the Gas Regulation Act, not only are these powers preserved, but the whole administration of the gas testing provisions is relegated to the Board of Gas Referees, who are empowered to prescribe places and times, and the apparatus that should be used, &c. In other words, for the first time in the history of gas supply, gas testing by an independent authority is adequately provided for, and within the power of the consumers to demand.

An undertaking must now supply its prescribed quality uniformly throughout the 24 hours. The recording calorimeter, though not at present certified as a standard test instrument, is, I understand, so near the stage of implicit accuracy, that we may expect in a short time to hear of the general adoption of this instrument. It is within your knowledge that some works for many years past have controlled the practical manufacturing operations by the aid of the recording calorimeter, and that the conditions governing the quality manufactured are controlled by exactly the same means as was formerly the case with the illuminating power. My own experience is that it is easier to control the manufacturing operations under the calorific standard than under the old conditions.

The Gas Regulation Act is the culminating point in a long controversy originating in an unfair basis of test. It has been claimed to be a charter of freedom which has undoubtedly released the manufacturer from many irksome conditions, and ensures to the consumer the due receipt of what he pays for; whether the financial provisions of the Act will in the long run prove to be advantageous to the industry may be questioned. The Act stereotypes the conditions prevailing in the pre-war year, and builds upon it increased charges of every possible description. It has no regard to the structural conditions of one undertaking operating with the most modern plant, and another still carrying on with the mediæval practices better suited to an antiquarian's mind than to an up-to-date process operation. They are both treated alike, and apparently those who can claim improvements in the method of manufacture since the pre-war year are claiming also to justify a higher standard price in consequence of improvements which they had neglected to introduce in the pre-war period. In my view the Act has largely destroyed the fundamental principle underlying the sliding-scale clauses, and has removed that zest for improvement and economy which the sliding-scale clauses were intended to foster.

The only effective way of forcing improvements and economy in any complicated manufacturing process not subject to the ordinary law of competition, is to make it difficult with old-fashioned plant to earn the profits necessary to pay the dividends on the capital involved. The period of operating under the calorific conditions has not been sufficient to allow necessary adjustments or developments in the manufacturing process in order to demonstrate what the change in the denomination of the produce sold is likely to bring about in the manufacturing operations. If we take a typical case where the testing records cannot be questioned, and producing coal gas only, and before the No. 2 Argand burner was in use, and compare the results of (say) 1904 with

those of last year—that is to say, the former period under the illuminating standard, and the later period under the calorific standard—I find that, without any material change in the type of plant used, there is an advantage of over 10 p.ct. in the production of heat units per ton of coal, as the result of more scientific verification of quality. To state it differently, with the horizontal system of best type working under the best conditions, we are able to produce from Durham and North of England coal 73 to 74 therms per ton to-day. If we accept this as a basis, then we are able to assess the relative advantages of the newer types of plant developed during the past few years, and, taking into account their increased capital cost and labour-saving advantages, &c., arrive at a sound conclusion.

The investigations of the Fuel Research Board, &c., during 1920-21 into the operation of vertical retorts and the effect of steaming the charge give us every reason to anticipate a production of 100 therms per ton of coal, with considerable labour economy in the cost of operating, but increased capital charges due largely to the accompanying labour-saving devices. When, however, we come to the labour question, it is here that I think the future economies must originate. The bad lay-out of a works, having regard to the manipulation of the raw material and the resulting products, can account for a very large percentage of the manufacturing costs. The lack of mechanical appliances for manipulating such material may also make a big difference in the final returns. Even to-day there are many works where the methods of fifty years ago are followed with the greatest persistency, and unfortunately the Statute protects from loss such a company, which, had it been an ordinary commercial undertaking, must have sunk into bankruptcy through not applying modern methods to its operations. I am not casting any reflection upon the engineers or officials of such undertakings—my sincerest sympathy is with them. But I do cast the blame upon the committees or directors of such concerns; and for this reason I urge that their pockets should be touched, in order to quicken their intelligence and their appreciation of modern equipment.

The immediate past has shown us that gas supply is a necessity for present-day conditions. The consumer has been called upon to pay up to double the price of pre-war times, but he has used more of the product, and has, we hope, learned to appreciate its advantages more than ever before. We must thank the war conditions for having afforded us a demonstration which could not otherwise have been achieved. The price of coal and the difficulties in obtaining it have redounded to our advantage from the selling point of view. The servant problem has added force to this demonstration; and it is not unreasonable to claim that gas is more firmly seated as a necessity of to-day than ever it was before. The commercial development of the business has been taken actively in hand by the British Commercial Gas Association, formed in 1912 especially with this object in view, largely through the pioneer work of Mr. F. W. Goodenough, and his abounding energy and ability in this direction. Their system of proprietary advertising, exhibition, and other development, has already done good work in the interests of the industry, by making known the real merits of gas and removing the prejudice which in pre-war times was a real hindrance to progress. So much for the past—What of the future?

That gas will be a necessity in the domestic sphere goes without saying, but we must be prepared to lose the lighting load in new constructions, and where re-construction takes place. The competition of electricity is largely hampered owing to cost of installation, and where property is already piped for gas lighting, we should, with modern appliances, largely retain it; and where electricity supplants gas for lighting, we should still retain in use for other purposes the existing gas supply. For applications other than lighting, gas has no real competitor, either in the kitchen or in the occasional rooms, with which must be included bedrooms and nurseries; and it is up to us to see that we retain these and extend their use. There are a multitude of counting houses and offices in every town, where gas should supplant coal fires; and while we cannot compete with large central-heating systems or direct fired hot-air circulating systems, we can encourage a market for smokeless fuel, the making and use of which is our prerogative. In so far as trade use is concerned, we have this field almost to ourselves, excepting where large users can do better by introducing producer gas; but where the town supply excels all others is in the constant supply for any purpose, at any time, and in any quantity required, by the simple turning of a tap. In the domestic sphere we can claim many collateral advantages and economies; but in trade spheres we have less claims in this respect, excepting where intermittent use is dominant. Our success here will depend much more upon the relative cost of other fuels and the rate at which we can offer gas, since in many cases heavy initial outlay must be incurred for installation cost. In all cases, however, we must follow the gas to the point of ignition, and on no account stop at the meter. We must compel the consumer to use it properly, and place in his hands what we know better than anyone else to be the best and most efficient apparatus at the lowest possible cost. This pre-supposes an efficiently-trained sales staff practically acquainted with the appliances and with the application of gas to every purpose imaginable. It is here perhaps that the juniors in age and experience have a new field open to them; but knowledge must precede any attempt at salesmanship, or the consumer will lose faith in his advocacy.

Mr. Laing, in proposing a vote of thanks to the lecturer, said the members were much indebted to Mr. Herring for his valuable contribution. When the Council asked him to favour the Association with his presence at their opening meeting, they hardly realized the task they imposed upon him in asking him to review the gas industry during the last 21 years. As Mr. Herring remarked, he could only "lightly trace" the extensive movements of the industry, but they would all agree that, not only had Mr. Herring treated such a big subject and covered so much ground with skill, but he had certainly brought home to them that the juniors had much to do. They should be ever alert to keep not only abreast, but ahead, of the times. The speaker remarked that, in his opinion, it might still be said, if not with the same conviction as in years past, that the type of burner used was affecting the calorific value obtained by the consumer. He himself had recently been shown a swan-necked burner being retailed at 1s. 5d., and he left the members to imagine what it was like. He wondered whether, if the war had not taken place, the industry would to-day have been in the same position as regards calorific value. The additional expenses incurred in connection with the Gas Regulation Act were factors smaller works had to consider, but when they had digested Mr. Herring's address, and considered the manifold difficulties and problems which had arisen and been overcome during the last 21 years, they might be excused for asking "What next?" As Mr. Herring said, to keep ahead of the times they must keep faith with the consumer.

Mr. John M'Isaac (Glasgow), President of the Western District, congratulated Mr. Laing on his appointment to the chair, and expressed his own pleasure at being present at the meeting. He also congratulated the Eastern District in having Mr. Herring to give them the opening address, which he had appreciated very much. In connection with the sales side of the industry, he considered the "B.C.G.A." had done wonderful work, but at present there was no proper selling organization.

Mr. J. J. Scott (Cowdenbeath), an hon. member, spoke of his appreciation at being there on this outstanding occasion in the history of the Association. During his term of office, the Association were in a precarious position, as about 60 p.ct. of the members were on active service, and the rest fighting in the gas-works. Mr. Herring came to them with an address, and resuscitated the Association.

Principal A. P. Laurie, of the Heriot Watt College, Edinburgh, remarked that people did not realize to the full what they owed to the men who supplied them with good water to drink and good gas for lighting and heating. He was sure they all appreciated the address very much.

Mr. A. T. M'Donald (Kirkcaldy) and Mr. J. Davie (Edinburgh) associated themselves with the previous speakers, and expressed their appreciation of Mr. Herring's address.

Mr. Herring thanked the President for his kind remarks, and the many other gentlemen who had spoken. It was a real pleasure to him to have been able to take advantage of the invitation. The future was with the juniors, as the juniors of to-day were the seniors of to-morrow. It had taken fifty years to settle a fair test of quality, and in his opinion it was much easier to control the manufacturing process by the calorific test than by the illuminating test. Any irregularity in working could be immediately noted, and quickly rectified. He concluded by wishing prosperity to the Association.

The members thereafter adjourned, and, accompanied by their lady friends, celebrated the "coming of age" of the Association at dinner. The toast of "The Scottish Junior Gas Association" was proposed by Mr. Herring—Mr. Laing and Mr. M'Isaac replying on behalf of their respective districts. A whist drive and dance concluded a memorable meeting.

The Reactivity of Coked Fuels.

In a long description of researches on this subject, spread over four numbers (June, July, August, and September), of the "Bulletin Mensuel" of the Swiss Gas Association, Dr. A. Rösli gave a detailed account of some most interesting work. He showed how he had studied the behaviour of coked fuels under heat at slowly rising, and at high constant, temperatures, determining the volumes and compositions of such gases as were given off. He was able to demonstrate how the individual elements of the combustible constituents behave; and his experiments satisfied him that coked fuels, which, however, still contained gaseous matter, could be completely cleared of this at relatively low temperatures—1000° C., for example. The course of the gasification and the composition of the gases depended upon the nature and manner of the heating. It was shown that gases produced when the coking period was long seldom contained more than 10 p.ct. by volume of nitrogen, and that, therefore, the high nitrogen percentages attributed in current literature to this cause are more likely due to the intrusion of air into ovens. The author discusses methods recently suggested for determining the reactivity of coke, and shows how he was able to test some of them. He describes a new method which he has worked out. This consists of passing a current of air over the coke, which is gradually heated up to 1200° C., and, by continuous analysis, obtaining the carbon dioxide curve and plotting it on a graph with the rising temperatures. It was shown that the reactivity of the coke substances towards air, carbon dioxide, and water vapour runs in parallel, and that it is dependent upon the degree of gasification, the formation temperature, and, to a very great extent, the nature of the surfaces.

Institution of Chemical Engineers.—Circumstances have compelled the abandonment of the meeting of the Institution projected for Nov. 12. In its place, however, a meeting will be held on Wednesday, Nov. 5, at 8 o'clock, in University College, Gower Street, W.C., when Dr. M. W. Travers, F.R.S., F.I.C., M.Inst. Chem.E., will present a paper on "The Water Gas Process."

YORKSHIRE JUNIOR GAS ASSOCIATION.

Twenty-Second Annual Meeting.

The Twenty-Second Annual Meeting of the Association took place on Saturday, Oct. 18, in the Lecture Theatre of the Fuel Department at Leeds University. Mr. W. HEATHCOTE (Halifax), the retiring President, presided over a very good gathering.

ANNUAL REPORT.

The annual report, submitted by the HON. SECRETARY (Mr. F. A. C. Pykett, of Halifax) stated that nine general meetings had been held during the year, including a joint meeting with the Manchester Junior Gas Association. The increased interest shown by the members had contributed to a very successful year. The membership was 167—an increase of 3 on that of the previous year. There had been five resignations, two transfers, and eleven new members had been accepted. The Council recorded, with deep regret, the death of Mr. G. Womack, of Bradford. Four Council meetings had been held during the session. Hearty congratulations were offered to Messrs. H. L. Bateman (Past-President), G. C. Bradbury, L. R. Bowcutt, C. H. Chester, J. E. Holliday, T. R. Mortimer, S. Smith, F. J. Jackson, T. N. Jackson, and to any other members who had gained promotion during the year. Mr. C. S. Shapley (Leeds), Mr. R. Halkett (Sheffield), and Prof. J. W. Cobb had been elected hon. members of the Association during the session. The Council tendered the thanks of the members to the various undertakings, engineers, and manufacturers who had given facilities for meetings and visits; and gratitude was also expressed to those undertakings which paid travelling expenses for their staffs to gatherings of the Association.

FINANCIAL STATEMENT.

The financial statement, issued by the Hon. Treasurer (Mr. H. Wilde, of Bradford), showed an income of £171, including subscriptions (£96), balance from the previous year, sale of the "Transactions," refund from the Joint Council pooling fund, &c. After payment of all outstanding expenses there was a credit balance of £89, as compared with a balance at the beginning of the year of £66.

The report and accounts were adopted, on the motion of Mr. J. M'LUSKY (Calverley), seconded by Mr. J. W. CARLTON (Shipley).

Mr. J. B. BALMFORTH (Bingley), commenting on the satisfactory condition of the accounts, suggested that it might be possible for the Association to contribute something—say, £10 10s.—to the Benevolent Fund of the Institution of Gas Engineers.

This suggestion was referred to the Council for consideration.

Mr. C. T. B. ROPER (Bradford) gave a report on recent work by the Joint Council of British Junior Gas Associations, of which he is Hon. Secretary. Mr. J. BRIDGE (Engineer and Manager of the Elland Gas Company) also spoke on this subject.

NEW OFFICERS.

President.—Mr. E. Gillett (Bradford).
Senior Vice-President.—Mr. R. N. Webb (Leeds).
Junior Vice President.—Mr. S. T. Musgrove (Sheffield).
Hon. Treasurer.—Mr. H. Wilde (Bradford).
Hon. Secretary.—Mr. F. A. C. Pykett (Halifax).
Assistant Hon. Secretary.—Mr. F. Firth (Leeds).
Hon. Auditors.—Messrs. A. W. Arnold (Bradford) and A. Lister (Yeadon).
Members of Council.—Messrs. J. W. Carlton, J. W. Holroyd, P. M'Nab, W. Heathcote, H. S. Boyes, and G. C. Bradbury.

The PRESIDENT offered a warm welcome to Prof. J. W. Cobb; Mr. H. E. Stone, President of the Manchester Junior Gas Assotion; and Mr. F. H. Robinson, Engineer and General Manager to the Harrogate Gas Company, and representative of the Manchester Institution on the Association's Council.

On the motion of Mr. C. T. B. ROPER (Bradford), seconded by Mr. A. Y. PLANT (Halifax), a hearty vote of thanks was awarded to the retiring officers for their work during the past year.

Mr. HEATHCOTE, in responding, paid special tribute to the enthusiastic and hard work of the Hon. Secretary (Mr. Pykett).

ADDRESS.

By R. E. GIBSON, Engineer to the Liverpool Gas Company.

First let me say how very much I appreciate the honour of being invited to address the Yorkshire Junior Gas Association. I do not know why you have gone so far afield as West Lancashire for someone to address you, unless it is that your retiring President, Mr. Heathcote, comes from Liverpool. I am glad to be with you because of my association with Mr. Heathcote, and also for another reason. I am a Yorkshire man, and proud of the fact. The first part of my life was spent in Yorkshire, and I received most of my training in this shire of many acres. A third reason is that this is a Junior Gas Association. The Junior Associations are doing a great work in providing opportunities for the exchange of views and experiences, for spreading knowledge, and enlarging outlook. They are of inestimable value to all those who hold secondary positions now, many of whom will rise to the higher and more responsible positions in the course of time, as many have done already. The membership of the Manchester Junior Association includes not only juniors, but a fair sprinkling of men who really should be classed as seniors. It may be the same in your Association; and, if so, it is not at all surprising, for in many respects the Junior Associations are more attractive than the Senior Associations. Their members are as a rule more active, more energetic, and more enterprising.

The need for well-informed and well-trained men in the gas industry was never so great as it is to-day. There are great problems to face in the future, upon some of which I will touch later. If the gas industry is to maintain its proper place as a great public service, it will need men of character and ability, men equipped with the necessary scientific knowledge, and capable of applying that knowledge to the best advantage possible. In this connection the new Education Scheme of the Institution of Gas Engineers is to be welcomed. It has established a high standard not too easy of attainment. Some have been disposed to criticize it as being too far in advance of what was previously in existence, and there may be something in the view that the high standard might have been attained by an intermediate step—*i.e.*, by a scheme at first not quite so exacting, to allow of the educational machinery to adjust itself more gradually to the new requirements. At any rate the new scheme will tend to ensure that aspirants for the positions of greater responsibility will in future be required to undergo a training which will more fully equip them for their duties than hitherto.

The processes of gas manufacture and bye-products recovery are so complex, involving so many chemical, physical, and engineering problems, that a good knowledge of these subjects is essential if the best results are to be attained.

When dealing with the question of education, one naturally thinks of the University of Leeds, who have so kindly placed this room at our disposal this afternoon. We as Yorkshiremen ought to be proud of this University, which (through the generosity of Sir George Livesey, Sir Corbet Woodall, and others) has been able to do so great a service to the gas industry in establishing a degree course in gas engineering and fuel. Many of us know something of the value of the work that is being done here to turn out young men scientifically trained to take up responsible work in the industry. It would seem to be desirable that the new Education Scheme should, in some way or other, be linked up or co-ordinated with the degree course in gas engineering at the University.

The gas industry is much indebted to the Gas Investigation Committee which, under the joint auspices of this University and the Institution of Gas Engineers, has carried out so much invaluable research work, which will no doubt bear more abundant fruit as time advances.

The old days with their rule-of-thumb methods have passed away, and in future the gas engineer will need to be more fully trained. He should also be a man of character, just in his dealings with his staff and workmen under him, fully alive to all that appertains to the well-being of his particular undertaking and of the industry generally. He should be ready to act on the good old maxim, "Whatsoever thy hand findeth to do, do it with thy might." It has always been to me a source of satisfaction that our work in the gas industry can be regarded as direct service for the good of our fellow men. The provision and maintenance of a gas supply to a community is undoubtedly a great work and a work which bestows one of the greatest blessings of modern civilization. If we look upon our vocation in the light of service for others, we shall have a sense of dignity and importance that we should not otherwise possess. In regarding our work as a means of doing good as well as a means of earning a livelihood, we shall certainly enjoy a sense of greater satisfaction.

We may also remind ourselves of the important part played by our industry during the war. We have the testimony of the late Lord Moulton, who, in his Presidential Address to the Institution of Gas Engineers in 1918, said, "Our industry furnished material for purely war purposes, without which it would have been impossible to maintain the fight." In the event of another war, our services for the extraction of benzole, toluole, ammonia, &c., will no doubt again be required to furnish the materials for warfare, so that our industry, whether in peace or war, plays an important part in fulfilling the country's needs. Lord Moulton, on the occasion just referred to, dealt with the question of fuel conservation, pointing out that the gas industry was in the most favourable position to solve the problem. Since then much has been said on this question, but little has been done.

We have heard a great deal about grandiose electrical schemes for solving the problem, but the promoters of these schemes have apparently closed their eyes to the claims of the gas industry, without whose help fuel economy to the greatest possible extent cannot be attained. Unfortunately for us, the men behind the electricity industry have gained the ear of the Government authorities and Committees in a way that we have not, with the result that our industry is treated more or less with indifference. There appears to be unwillingness to give credit to the gas industry for what it has already done and is doing now to effect the conservation of coal on a large scale. It is true that carbonization and recovery of bye-products are considered desirable, but, as we in the gas and coke-oven industries are the only people who have had long experience in these processes, one would expect some recognition of the work that has been accomplished.

Until "the powers that be" recognize the supreme importance of the work we are doing, and have been doing for a long time, there is no hope of advancement on right lines. There is little doubt in my own mind that sooner or later co-operation will have to take place between gas and electricity undertakings. Such

co-operation will be necessary in the interests of coal economy. We are all ready to admit that electricity has its place in the world and is very useful for certain purposes. We are equally sure that for certain other purposes gas is far more suitable than electricity, and that the gas industry must be included in any great scheme for fuel conservation.

Most of you will have been to see the British Empire Exhibition at Wembley; and I am sure you have admired the well arranged Gas Exhibit, which should be of incalculable benefit to the industry. One of the features of the Exhibition which, in my opinion, might have received greater prominence, is the demonstration of the scientific methods by which the coal of this country can be used with greatly increased efficiency, and economy, and the smoke evil at the same time abolished.

At the World Power Conference held at the Exhibition, however, I am glad to say that the facts concerning these matters were pressed home. In the words of Mr. Goodenough, "It is coal or nothing with us." There is practically no alternative to coal in this country for the supply of light, heat, and power; and yet we are content to waste coal at an enormous rate every day. Out of a total output per annum of 250 million tons, only 30 million tons, or 12 p.ct., of this quantity is distilled for the production of gaseous and solid smokeless fuel and various bye-products. Here is a tremendous field for economy; and the sooner the problem is tackled, the better it will be for this country. As a nation we are dependent for our oil supplies on other countries. If carbonization were carried out on a large scale, instead of direct combustion, the production of motor spirit, fuel and other oils, fertilizers, &c., would place us in a far stronger position as a nation than we are to day, and would make us to a great extent independent of other countries as regards oil supplies, while the large quantities of gas and solid smokeless fuel that would also be produced would be available for use in the place of coal. Instead of exporting raw coal, coke could be exported in much larger quantities than hitherto. There are difficulties, but I am sufficiently an optimist to believe that they can and will be overcome. Such proposals must be commercially sound if they are to be adopted. The saving in coal that can be effected by increased efficiency would appear to warrant the adoption of some process or processes of carbonization on a very large scale. Many different processes are in operation, and much research work has been and is being done by the Fuel Research Board, the Gas Investigation Committee, and other bodies. We have heard a great deal about low-temperature carbonization. This process demands our careful consideration. So far it has not commended itself to gas authorities on financial grounds. I firmly believe that if it is ever to be made a success it will have to be taken in hand by the gas industry. The development of other processes such as the Maclaurin and the Sutcliffe-Evans will be watched with much interest. Some modified scheme combining the best features in the various processes now in use may prove to be the solution.

The advocates of low-temperature carbonization have suggested utilizing the large quantities of poor coal which at present are left at the colliery because they are not worth the expense of handling and transport. Unless a very large proportion of the incombustible material contained in such coal was extracted at the collieries before carbonization, the coke produced would be of a very inferior quality. Some of us have reason to remember the great difficulties experienced during the war on account of the rubbish that went by the name of coal at that time; and we have no desire to repeat such experiences. Ash is useless; and the sooner it is eliminated the better. If left in the coal, there is loss in transporting useless material, increased labour in dealing with the ashes and clinker in the furnaces, cartage of the ashes to the tip, and the inferior quality of the coke produced. The colliery is unquestionably the right place for dealing with this material; and everything that can reasonably be done should be done to clean the coal effectively before it is placed in the trucks.

Let us consider the alternatives to the use of raw coal for industrial and domestic heating purposes. They are furnace coke from coke ovens, gas coke, free-burning smokeless fuel (such as "Coalite"), gaseous fuel, fuel oil, tar, &c., and electrical energy. The first three are all smokeless fuels, and fuel such as "Coalite" would undoubtedly be the most suitable for domestic use if it could be produced at a reasonable price, owing to the fact that it will burn more freely than either of the other two, and it is ignitable. Fuel oils are suitable for industrial and transport purposes. Electricity for heating purposes is uneconomical as regards coal, and costly. Moreover it would have to be generated by the use of one or other of the fuels previously mentioned if the burning of raw coal were to be prohibited. Gaseous fuel is particularly suitable for domestic use and also for a large number of industrial uses. There are no transport charges, the fuel is delivered by pipeline and is on tap, available at a moment's notice. I need not enumerate the many advantages to be derived from the use of gas before an audience such as this. It is essential, however, that the price should be kept as low as possible; and that the service should be at all times thoroughly reliable and good.

In working out the cost of gas for heating purposes, compared with other fuels, the saving in servants' wages, freedom from smoke and dirt, avoidance of chills, saving in doctor's bills, no chimney sweeping, &c., should be taken into account. It is difficult to place an exact money value on these savings, but there is no doubt whatever that such savings must be considerable; and taking these into consideration, gas will compare favourably with any form of solid fuel, and will be far cheaper than electricity.

Our electrical friends certainly have an advantage over us as regards their methods of charging. These methods are worthy of our study. The electricity authorities are generally able to offer current at a price which will secure business in competition, however high their actual cost of production and distribution may be. In the gas industry the simple and straightforward methods of charging for gas, in use to-day, have remained unchanged for a great many years with but few exceptions. Unfortunately, so far as the companies are concerned, the Gas Regulation Act imposes limitations which prevent any great departure from normal practice. We are all much interested in the novel method of charging for gas introduced by Mr. M'Lusky at Halifax, and shall watch its development closely.

In many towns electrical competition is now being felt in the domain of heating and cooking. A quarterly rental on the rateable value of the house, *plus* ½d. per unit, looks attractive, especially as, after the quarterly rental has been paid, any additional consumption is at the low rate of ½d. per unit. Such competition as this emphasizes the need for keeping the price of gas down as low as possible consistent with good service, and also seeing that only the most efficient gas appliances are used. If these matters are attended to, I do not think we have anything to fear from electrical competition as regards heating. With respect to lighting, however, the position is different.

Human nature being what it is, most people nowadays will not take the trouble to clean and adjust their own lighting burners with the result that they put up with a poor light, blame the gas, and finally instal electricity. If free maintenance and inspection were universally adopted, they would go a long way towards retaining our lighting business. There are two points that we cannot press too strongly—viz., gas light is a soft diffused light, and therefore not injurious to the eyes. There is an absence of glare. Electric light on the other hand is intense and concentrated, and is trying to the eyes unless well toned down by shades. Secondly, gas lights are sources of heat as well as light, and promote ventilation.

If an article or service is good and the cost is reasonable, it will commend itself. We can successfully meet competition in lighting if we have full confidence in the commodity we supply and are prepared to give it a fair chance by installing good burners and by attention to systematic inspection and maintenance.

In view of recent events, the question of systematic inspection and maintenance of consumers' appliances and fittings is becoming one of supreme importance, and will demand greater attention from the whole industry in the near future. Let me commend it to you as a subject worthy of your special study and consideration during this session. The limited time at my disposal this afternoon will not permit me to enlarge on this very important aspect of gas service. May I just say that our future existence as an industry depends in no small measure on the retention of the goodwill of our consumers by giving them satisfactory and efficient service not simply as regards the gas supply, but with respect to the whole of the gas installation right up to the point of consumption. It is a matter that will require careful handling, perseverance, and courage. Many minds are already working on the problems in connection with this extension of our work; and we may hope to see further developments soon.

Votes of Thanks.

The President remarked that Mr. Gibson had given the meeting a wide survey of the gas industry from the points of view of education, engineering, and supply. The Association always appreciated the address at the opening meeting of the new session by some leading member of the industry.

Mr. J. Balmforth (Bingley), proposing a vote of thanks, said it was very fitting that Mr. Gibson should have come to his native county of Yorkshire on the occasion of the completion of 21 years' useful work by the Yorkshire Junior Association. He could assure Mr. Gibson that the juniors always appreciated such addresses. It was only by close co operation between seniors and juniors that they would all get the best out of the industry.

Mr. R. N. Webb (Leeds), seconding, said Mr. Gibson had wondered why the Yorkshire Juniors had gone to West Lancashire for someone to give an address. As a member of the Council of the Association, he could say they always did their best to get gentlemen who were in a position to know many sides of the industry and able to give an address which would be of real service. It was a most valuable feature of their annual meeting when they could find a gentleman who could spare the time to come and talk to them, and who was in a position to see the industry in all its phases. So many of the members of the Association were largely restricted in their daily activities to one particular side of the industry. Mr. Gibson, of course, had passed through that stage, and now was able to know what was being done both on the works and on the commercial side; and it was certainly the combination of these features to which the members looked forward in the annual address. He thought they would all agree that their choice this year had been exceedingly good. They had listened to a very able address. It did the juniors good to hear the industry spoken of so briefly and yet so hopefully. There were undoubtedly many fields yet unexplored in the gas industry. The Association received tremendous help and encouragement from Prof. Cobb and the authorities of the Leeds University. He was confident there was unlimited scope in the gas industry, and that they could hold their own against the electrical industry easily, if they all put their shoulders to the wheel.

Mr. Gibson said he was always glad to do anything he could to help the Junior Gas Associations. He noticed at an earlier stage of the meeting that a suggestion had been made as to the possibility of making a donation to the Benevolent Fund of the Institution. As a member

of the Committee of that fund he received a pleasant surprise. The Committee of the fund certainly needed all they could get. The expenditure had been materially increased lately, and they would certainly be very glad if the Council of the Association found it was practicable to make a donation.

The PRESIDENT, in proposing thanks to the University authorities and to Prof. J. W. Cobb for the help given to the Association for many years, said it was 21 years since he first meeting had been held in that building, when Prof. Smithells had addressed the juniors on their formation. They had enjoyed the use of the rooms often since then, and were greatly indebted to the authorities and to Prof. Cobb.

Mr. S. T. MUSGROVE (Sheffield) seconded, remarking that the willing help and encouragement of Prof. Cobb was a great factor in the continued virility of the Association.

Prof. COBB, responding, said that the vote of thanks, and his reply, were becoming a kind of "hardy annual." The authorities of the University were glad to be of any possible assistance, and were thankful for the appreciation shown. He believed Mr. Gibson had made a reference to the desirability of close association, such as already existed at Leeds, between the gas industry and the Fuel Department of the University—in particular that the new education scheme of the Institution of Gas Engineers might be linked to the University by a degree course in gas engineering. Probably Mr. Gibson was aware that the matter had been under serious consideration. It would be premature to say anything definite, but he had every confidence, on account of the nature of the communications which had passed between the Institution and himself, in saying that it was practically certain that a perfectly satisfactory understanding in that connection would quickly be arrived at. Prof. Cobb reminded the meeting that the laboratories of the Fuel Department, now as in previous years, were open for their inspection, and perhaps this year they might be specially interested in the newly-erected "Corbet-Woodall" gas plant, put up as a memorial to Sir Corbet Woodall by Mr. Henry Woodall, with the help of some other gentlemen who wished to be associated with him in the gift of that plant to the University.

Mr. HEATHCOTE tendered the apologies of Mr. M'Lusky, Engineer and Manager to the Halifax Gas Department, for unavoidable absence. Mr. M'Lusky, who usually tried to be present at the annual meeting, sent his greetings and best wishes to the Association and the new President for a successful year.

After the meeting, the members, under the guidance of Prof. Cobb, spent some time in examining the "Corbet-Woodall" plant and other equipment in the Department. Subsequently tea was taken at the Victory Hotel, Leeds; and the evening was spent in an enjoyable smoking concert.

Toasts were given, following the Loyal Toast, to "Kindred Associations," to which Mr. STONE replied, and to "The New President," proposed by Mr. HEATHCOTE.

COKE-OVEN MANAGERS' ASSOCIATION.

Visit to the Consett Coke Ovens and Brick Works.

The famous north-country enterprise, the Consett Iron Company, Ltd., offers attractions to many kinds of industrial sightseers, controlling, as it does, collieries, coke ovens, and brick works, as well as the most up-to-date steel works. As will be seen later, from the speech of Mr. E. J. George (the General Manager), it has been, and still is, the aim of the very enterprising management to keep not only abreast, but even rather ahead, of the times in all departments. Thanks to skilful handling of affairs in better days of the past, they have been able to satisfy their ambitions, in spite of what is generally now known as the post-war slump. And they are in an excellent position, in all respects, to take full advantage of better times, when they come along.

The Coke-Oven Managers' Association were, therefore, extremely fortunate in being able to accept an invitation from the Consett Company to inspect their silica brick works and newest coke-oven plant on the occasion of their annual meeting, which was in Newcastle on Friday and Saturday last, Oct. 17 and 18.

THE MEETING.

At the meeting, good progress was reported in the membership of the Association, which had been brought up to a total of 272. Mr. C. P. Finn, B.Sc., F.I.C., of Rotherham, the retiring President, was supported in the chair by the Hon. Secretary (Mr. M. E. Nicklin, of Wombwell), the Hon. Treasurer (Mr. J. W. Lee, of Grassmoor), and members of the Council. Mr. Finn was appointed to succeed Mr. E. M. Myers as the representative of the Association on the Fuel Research Committee of the British Association, and he is also serving, for the Midland Section, on the Mining and Fuel Committee of Sheffield University.

Mr. T. B. Smith, F.C.S., of Middlesbrough, the new President, is an Associate of the Institution of Gas Engineers. In his Presidential Address, he referred to the bad times they were experiencing as makers of metallurgical coke, and to the super efficiency of plant and excellence of products which bad trade always calls for. With regard to the latter, they must have clean coal to work with, and, just as makers of steel, iron, and coke have to work to specification, so he appealed to collieries to do likewise. He urged the members of the industry not to be content with leaving research work entirely in the hands of the more academic among them and of the fuel departments of the universities, impressing upon them the greater value to themselves in many cases of research carried out on a practical or semi-practical scale.

The Templetown Brick Works.

There was a large gathering of members for the visit on Saturday morning, and, on arrival at Consett Station, they were conveyed by motor omnibus and chars-à-bancs to the Templetown Brick Works of the Consett Iron Company. Here they were met by a number of the Company's officials, including Mr. E. J. George (the General Manager), Mr. A. H. Middleton (Superintendent of the Coke and Brick Works), and Messrs. G. J. Greenfield and T. Jenison (Managers respectively of the coke and brick plants). Very much appreciated was the assiduity with which the officials conducted parties and answered questions.

The Templetown Works are devoted entirely to the manufacture of silica refractories, as distinct from the Elves Works, where the Company have made fireclay and semi-siliceous material for upwards of forty years. The Company are large consumers annually of refractories of their own manufacture in iron and steel works and coking plant, so that the materials made are under continuous test on the spot in actual working conditions. In the large modern laboratory, which was one of the first objects of interest to be inspected, research and routine tests are always in progress, with up to-date and specially designed apparatus. The Company claim to produce silica bricks and shapes which have no permanent or after expansion. In tests, the greater part of the expansion is shown to be complete below 600° C. There is practically none from 1000° to 1400° C., and above this a slight contraction occurs. Carbonizing engineers who are contemplating the erection of new plant have the hearty invitation of the Company to inspect the new coke ovens which, they are convinced, will clearly demonstrate the superiority of silica over fireclay and semi-siliceous materials.

MAKING "CONSETT" SILICA.

The raw material is obtained from the Company's own quarries, which are situated in one of the largest and best ganister-producing districts in Great Britain. The works are designed specially for the production of silica refractories for the use of gas-works, coke ovens, and steel works. The plant is claimed to be the most up-to-date in the country—perhaps even in the world—

MR. T. B. SMITH, F.C.S.,
President of the Coke-Oven Managers' Association.

and the greatest stress is laid on the scientific control of every detail, from the quarrying of the raw material to the dispatch of the finished product. Special care and research are devoted to the selection, combination, and grinding of the various rocks required to produce materials suitable to the particular purposes for which they are destined, with mechanical strength and low porosity always well in view.

The stone is roughly crushed in two jaw crushers, whence a gravity-bucket conveyor takes it either to storage hoppers or to an automatic weighing hopper. There are two mills, of about one ton capacity each, where the stone is ground and mixed with the binding material; the mills being specially designed to permit of

accurate weighing and control of the mixture. The silica mud or "clay" is then ready for hand-moulding into bricks or shapes with steel moulds—a fascinating process which was watched with much interest—the bricks six at a time, the shapes one or more according to size. They are then conveyed on small rail cars; these, with their load, entering a Proctor tunnel dryer, in which they are dried by means of steam-heated air currents. By degrees they proceed through this, one car emerging with its dried load as each new one enters at fixed periods. They are then sufficiently hard to handle, and excess moisture, which would cause steam in the kilns, has been expelled.

The kilns are eight in number, four of a size to take 80,000 standard 3-in. bricks each, and four for 100,000 each. The heating-up is necessarily gradual, and the firing is regulated by means of pyrometers and Seger cones. The kilns attain a temperature in eleven to twelve days which is sufficient to ensure complete quartz conversion, and, consequently, entire absence of permanent expansion. The kiln is then sealed, and cooling, which is entirely by radiation, occupies some three weeks. The "set" material is then stored in dry sheds, where a rigorous inspection for size and soundness is made before dispatch. Railway sidings run right into the store sheds, so that loading is expedited.

The whole plant gives the impression of ample space, smooth working, maximum possible comfort for the workmen, and efficiency. The insistence upon detailed control and frequent tests at all stages of the process must make for a high-level standard of quality.

The Fell Coke Works.

Embarking once again on the motor conveyances, the visitors soon found themselves at the Fell Coke Works, next to which are the steel works of the Company, now in process of being entirely renovated. The coke ovens are the last word in modern construction, and show the enterprise of the Management in striking out into what, for this country, is an entirely new line. The plant has been in operation since April 1, and has more than exceeded expectations, though, with the typical Consett spirit, the staff say they will never be satisfied that the best results have been achieved, but will always be aiming at greater and greater efficiency. During the past eight weeks the plant has been operating at its maximum capacity, dealing with 1000 tons of coal a day, with a 77 p.ct. coke output.

The Coking Plant.

The coal-handling plant deals with rough or small coal direct from the Company's own pits. The trucks are bottom-discharged into a ferro-concrete hopper, of a capacity of 60 tons, from which the coal is fed, by a reciprocating tray feeder, to a crusher of the hammer mill type, by the Pennsylvania Crusher Company. Each crusher is driven by a 200 h.p. motor running at 725 r.p.m., and is capable of dealing with 100 tons of coal in an hour. Of the crushed coal, 85 p.ct. passes through a $\frac{1}{8}$-in. sieve. The elevator is of the ordinary bucket type. The storage bunker, by Industrial Constructions, Ltd., is of ferro-concrete, and has a capacity of 2000 tons.

The battery consists of 60 Wilputte regenerative ovens, each 37 ft. 5 in. long between doors, and 16½ in. wide on the pusher side and 19 in. on the coke side, by 10 ft. 6 in. The coking period is 16 hours gross (15 hours 44 min. net), so that the plant at maximum capacity is equal to 90 ovens per day. Plug doors are used on both sides, that on the pusher side being operated by an attachment to the pusher carriage. The coke is pushed through a guide into a car which has a sloping floor of cast-steel plates, and which is run by an electric locomotive to a central quenching station. One charge is usually dealt with at a time, though, if necessary, the car is capable of dealing with two. The quenching is controlled by an electrically operated automatic water valve, which is capable of accurate adjustment to the quantity of water required. After draining, the coke is discharged on to a sloping bench, from which it is conveyed by a 36-in. Robins rubber belt to the screening plant. Smalls below 2 in. are removed by a grizzley screen, and forced on to a rotary wire screen. The pusher, coal lorry, coke guide, and coke car and locomotive have all received special attention as regards strong construction. Designed for rapid operation in accordance with the latest American practice, they were built in England by the Wellman, Smith Owen Engineering Corporation, Ltd. The time required to push an oven is only about 35 seconds—a matter of some wonder to many who saw the plant for the first time.

Heating System.

The heating is most carefully controlled. The recording gauges, flow meters, stack draught balancer, and automatic clock controlling the reversing machinery, drew a good deal of interested attention to the meter house under the main bunker. The temperature in the combustion flues at oven sole level is about 1370° C. on the pusher side, and 1410° C. on the coke side. The oven wall in contact with the charge is at about 1050° to 1100° C. The gases at the base of the ascension pipe are about 575° C., and, owing to rapid cooling by a liquor spray system, which has worked admirably, they are at about 200° C. in the collecting main. The waste gases go to the chimney at 320° to 370° C.

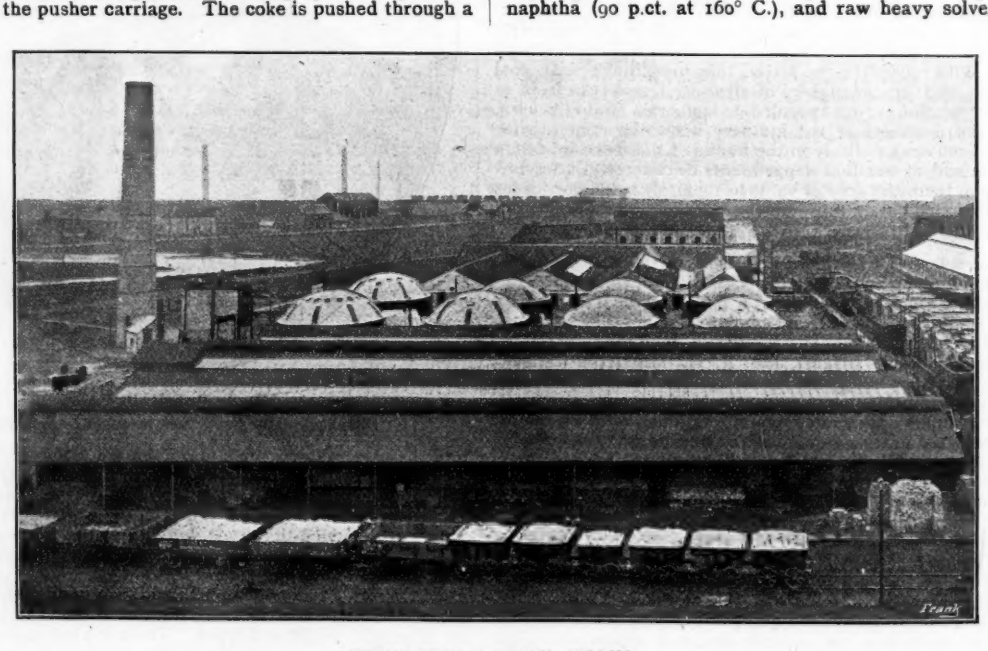
Bye-Product Recovery.

The gas leaves the ovens by short 14-in. diameter ascension pipes; and there are no serious signs, after six months, of carbon deposit. There are two collecting mains, each serving 30 ovens. It is by means of a large flow of liquor, which amounts to 40,000 gallons per hour, delivering not only at each end of each main, but also on to each individual valve, that the gas is cooled to the low temperature of 200° C. on entering the collecting main. The cleaning of this is thus able to be done by one man, working only four to eight hours a week.

The main to the bye-product plant is of 38-in. diameter; the gas arriving at the primary coolers at about 20° C. Cooling is effected by multi-tubular serpentine air coolers, the gas passing from them at about 30° C. through exhausters. These, in duplicate, are by the Connersville Blaver Company, and are driven by 108 h.p. twin cylinder vertical steam engines, by Marshalls. In the tar extractors, supplied by the Cie. Anye. Continentale Ci-Devant J. Brunt, of Paris, the gas is forced through perforated cylindrical plates, which rotate slowly about their own axis, and are thus continually washed with fresh tar.

The ammonia plant is of the semi-direct type. Condensed liquor is passed through a still, the vapours from which are led into the gas stream just at the entrance to the saturators. These are of the Coppeé type, the gas entering through a lead bell, which has an open bottom and a series of holes in the sides near the bottom. The depth of the acid seal is about 22 in. The gas leaves the saturator at 40° to 45° C., and is recorded in the same type of cooler as before.

The products of the benzole plant are motor spirit, solvent naphtha (90 p.ct. at 160° C.), and raw heavy solvent naphtha.



TEMPLETOWN BRICK WORKS.

The recovery is by means of ordinary tower scrubbers with "Shell-Mex" gas oil. The crude still is of Coppée design, and is connected with a dephlegmator, by the same Company. The object of this is a partial rectification of the crude benzole, so as to eliminate, when possible, the first redistillation. That is to say, the condensate from the top of the dephlegmator may be washed direct.

CLEANLINESS AND COMFORT.

A feature which was specially studied in designing the plant, was the elimination, as far as practicable, of conditions of discomfort for those responsible for its working. That considerable success in this direction has been achieved, was evident with the battery in full swing. Removal of steam from coke quenching is provided for in the quenching tunnel. The battery is kept remarkably free from smoke by the provision of automatic regulators, which maintain a constant pressure, slightly above atmospheric, on the collecting mains, and by the exhauster governor, which keeps a constant suction of about 50 mm. before the primary coolers. Each ascension pipe is fitted with a steam injector, which is brought into play in the loading of the ovens. The ascension pipe cap is closed, and the valve lifted, and steam is turned on as the coal is run in. This carries away the greater part of the gas evolved during charging, and not only effects economy of gas, but also makes the task of sweeping-in much less hard.

At present, during the remodelling of the steel works, the gas burns to waste; but it will be used at these works when they are again in operation.

THE CONSETT COMPANY'S ENTERPRISE.

Lunch was taken at the invitation of the Consett Iron Company, in St. Aidan's Hall, Blackhill.

The PRESIDENT, in a brief speech, gave the toast of their hosts, coupling with it the names of Mr. E. J. George and Mr. A. H. Middleton. Many of them, he said, had been to the works at least four times before, and there was always something new to see, and always the same kindness and helpfulness from the Company.

Mr. J. W. LEE (Hon. Treasurer) seconded.

Mr. E. J. GEORGE responded with a speech which was quite one of the most entertaining features of the day. Referring to the difficult period through which all are passing, he strongly deprecated what he called the "stinking fish" attitude towards British trade. While newspapers and politicians had been talking, his Company, at all events, had been trying to get on with their job. Courage had been required, but they had made up their minds to do things with what some might have designated recklessness. But he did not agree. During the last three to four years, they had built hundreds of houses, and by September next year 1820 would have been completed, all with their own labour and their own materials, and without employing any outside contractors. They had embarked on new colliery undertakings, some of which were in full work, and others still in the initial stages. They had laid down their silica brickworks, which were probably the finest in the world; and they had erected the coke ovens, which were unique in Europe. Almost, he might say, as a side line, they had also been trying entirely to reconstruct their iron and steel works—a difficult and an adventurous undertaking in these times. They hoped to start work in January, and to have them completed by June. Considering that the replaced plant was running as recently as April, 1923, he might claim this as something of a feat. Through it all, the Directors had always in mind the absolute necessity of producing at the lowest possible cost. This, they maintained, was the way to the much-desired trade revival.

They did not intend even now to stand still, and their policy always was to look ahead, and to put their work in hand in good time—not wait until it was actually required. Under consideration already were such projects as replacing their older coke ovens, doubling their new plant, and erecting a bye-product works in the neighbourhood of Newcastle. In the latter connection, he hinted at possible co-operation with the gas undertaking. He was of opinion that the good coking coals of Durham should not be exported as such, but should be carbonized at home. He was confident of expanding world markets for bye-products, and as to the coke he had great faith in educating the British people up to central heating. By no means the least satisfactory side of the picture was the increased employment the Company had been able to give. Already their figures were 2500 above 1913, and, when present schemes were completed, up to 1500 more could be given work. He envisaged, in the not very distant future, a number up to 5500 above pre-war.

Mr. A. H. MIDDLETON seconded, and emphasized the willingness of the Company at all times to place their experience at the disposal of those who were faced with the selection of new plant.

With this the proceedings concluded.

Spontaneous Combustion in Coal Heaps.—In the course of a paper on "Spontaneous Combustion: Diffusion of Gases," read at a meeting of the South Wales Institute of Engineers at Cardiff, on Thursday, Oct. 16, Sir William Galloway, D.Sc., remarked that the sweating of coal which occurs in a heap when its temperature is rising owing to its absorption of oxygen appears to be due to the evaporation of the hygroscopic moisture in the pores of the coal at points in the heap at which the temperature is higher, and its condensation at other points at which the temperature is lower. It may be assumed that a mixture of air and water-vapour is rising slowly and continuously upwards through the heap, while fresh air is flowing into it at the lower level to take the place of that which has escaped above. Oxygen derived from this source appears to be drawn into, and compressed in, the pores from which the water has been liberated, and the heat produced by the compression of the oxygen appears to be great enough not only to evaporate additional water, but also to raise the temperature of the coal.

SCOTTISH JUNIOR GAS ASSOCIATION.

(WESTERN DISTRICT.)

Opening Meeting.

The Opening Meeting of the twenty-first session of the Association was held in the Royal Technical College, Glasgow, on Saturday afternoon, Oct. 11, when nearly a hundred members assembled under the Chairmanship of Mr. ANDREW WALKER (Kilbarchan), the Past-President.

The CHAIRMAN intimated that the Council had that afternoon elected Mr. James Brown (Glasgow) to fill the vacancy on the Council caused by the resignation of Mr. G. Carr (Dumbarton), who had recently gone abroad.

The HON. SECRETARY (Mr. John Murray) mentioned that the various Societies using the College rooms had recently met, and had resolved to present to the Governors of the College a cinema projector, as a slight return for the free privileges accorded them. The apparatus would be at the disposal of all Associations. It was unanimously decided to give the proposal full support, and the Secretary was asked to attend the next meeting, with power to act for the Association.

The CHAIRMAN then introduced the new President, Mr. John M'Isaac, of Glasgow, and in doing so thanked the members for the support he himself had received during the past year.

Mr. JOHN M'ISAAC (Glasgow), who was received with applause, thanked the members for electing him President on the twenty-first year of the Association. He then proceeded to deliver his address, the main portions of which are reproduced below.

PRESIDENTIAL ADDRESS.

A question which materially affects the junior of to-day is the future prospect in regard to the vacancies that are likely to occur in all branches of the industry. A careful analysis of the position will, I think, compel him to consider seriously which is the most suitable branch to enter, also the advantages offered. All of the branches require different training and character, and not many are fortunate in possessing the full complement, so that the greater is the need for specializing. Success is governed to a large extent by the characteristics of the individual, which suggests that one should exercise the faculty of self-analysis when considering the choice of a career.

EDUCATION.

The junior of to-day follows a given course of study, which he hopes will so fit him that he may offer himself as competent to apply his abilities in whatever branch a vacancy may occur; yet owing to the necessity for specializing, this is impossible. It is only just to say that such a standard of education is not the fault of the junior, but rather the weakness of the schemes which do not specialize courses to suit peculiar requirements of the industry. The introduction of salesmen circles is an endeavour to provide a means of instruction for an important section of the industry; but what of the other branches?

Take, for example, the new scheme of education recently inaugurated by the Institution of Gas Engineers, wherein a very high standard has been made compulsory before the student can hope to attain the higher positions in gas manufacture or distribution. The theoretical qualifications are the primary object to be attained, and in the scheme as now drafted these are well provided for; but what has been, or is being, done to offer equal facilities to obtain the equivalent in practical experience? It will, I think, be admitted that a full practical experience coupled with the theoretical is the aim of all; but to what extent each is obtained by the individual depends entirely on the size, equipment, and location of the undertaking in which he is employed. It is obvious that the equivalent in practical experience to the theoretical demands that the student must have a very wide and varied experience, which would entail constant changing from one works to another, and such procedure does not always suit his theoretical training. The student who resides within easy reach of the training college may also be fortunate in having employment in a large and modern works, or he may only be in a small works, either of which separately does not ensure the full practical training, though collectively they would.

A PRACTICAL TUITION SCHEME.

What, therefore, is the solution? I suggest that facilities could be arranged for practical tuition in all branches of the industry, if responsible heads of gas undertakings would consider the suggestion that equal facilities should be available for transfer of registered students between undertakings, and be applicable to all categories. Juniors of to-day may say that such an ideal is of little use to them, and to some extent I agree; but they have to remember that, while the advantages are more in favour of the juniors of to-morrow, they themselves are the prospective seniors, and for this reason the suggestion is of special interest, since the scheme would be subject to their jurisdiction.

THE DISTRIBUTION SIDE.

To-day the gas industry offers unlimited opportunities to the ambitious junior, and not the least important are those of the specialized branches on the distribution side. Gas manufacture is undoubtedly the primary stage, and has a fascination peculiar to itself; yet the number of men who have the ambition to enter

this branch is far in excess of possible prospects, so that the majority must of necessity enter the specialized branches for an outlet to their ambitions. A visualizing of the future in the knowledge of present-day problems suggests that the use of gaseous fuel will become a compulsory measure. This prospect suggests two main features—first, enlarged gas producing plants; and, secondly, a corresponding increase of specialists to cope with the unlimited possibilities.

The provision of the gas and bye-products is the duty of the gas engineer and the chemist, both of whom can be relied upon to fulfil their functions in the great schemes of the future. But what of the distribution, sale, and application of the gas? Do we fully appreciate the importance of our existence in the scheme of things? Can we confidently assert, without fear of contradiction, that we are ready and fully equipped for any emergency? I doubt very much if we can truthfully say "Yes."

Gas, considered as a fuel, is an infant in science, when we pause to consider the amount of research work which has been carried through with regard to other classes of fuels; yet the progress and developments in recent years encourage us to be optimistic of the future. The first problem is distribution, and in this branch one of the fundamental principles is an adequate pipe system capable of immediate extension, perfectly proportioned, and governed to allow for future possibilities. The essential qualifications of the distribution engineer necessitate not only theoretical and practical abilities, but also the faculty of determining the future possibilities in any given area. Industrial heating specialists, district inspectors, showroom managers, and salesmen, though engaged on work beyond the mains, require theoretical and practical distribution training sufficient to enable them to understand and appreciate the fundamental principles. Commercial intelligence, including office routine, is a valuable asset in the general knowledge of all ambitious juniors, and should be acquired by all who hope to hold responsible positions.

To all juniors of to-day I would emphasize the importance of making an early decision in the choice of the particular branch it is desired to follow. They should get the best advice possible, both with regard to personal suitability and future prospects, and finally the best course of subjects to study. I might add that there are certain characteristics essential in each individual; and though none is possessed of them all, these can at least be cultivated. Temperament, personality, confidence, tact, positive and concentrated thinking, including the faculty of self-analysis, are those I would recommend; and the individual who has these added qualifications need have no fear of reaching the zenith of his ambitions.

FUTURE POSSIBILITIES AND SALESMANSHIP.

Collectively, we are most concerned with the problems of to-day, but what of those of to-morrow? Does the present high state of development suggest further improvement? Is it possible that anyone can confidently assert that the gas industry will reach a stage in the world schemes sufficient to be the prime factor of our existence? I, personally, am of the opinion that the day is coming, and is not far distant, when gas will be the primary fuel for all purposes for which heat is required. Gas production is the primary stage, but like other manufactured goods it must be distributed and sold to the customer, and for this reason we must have an efficient selling organization.

Our first step is to create a desire for the article we manufacture, and how is this to be done? Publicity, of course. This is a branch of the industry which has been developed to a fine art, yet, with all that has been done, it has not achieved the success which one might expect, and why? Because of the absence of an equally efficient sales organization throughout the industry to-day. Whether the undertaking be large or small, selling is of equal importance, and to those undertakings which have deemed it expedient to instruct their staffs in a salesmanship course the results have been eminently satisfactory.

Salesmen's circles have been inaugurated throughout the country with the prime object of providing an opportunity of promoting discussions on subjects peculiar to the selling of gas; but does this system really function as a real sales organization? Personally, I doubt it, because of the tendency for discussion to develop around technical and practical difficulties experienced on the district—beneficial to individuals, no doubt, but prone to divert the mind from the main issue, which is salesmanship. A co-ordinated selling staff is just as essential to the gas industry as it is to any other group of manufacturers; and for this reason every undertaking ought to have men on their staff who are competent in their knowledge of the article they are offering as the most important asset of their knowledge of salesmanship.

How many men are there to-day engaged on the selling side of the gas industry who have had the requisite salesmanship training, apart from their actual experiences as representatives of any gas undertaking? A limited proportion only, having regard to the number of men employed. It may be said that every man on the staff is a potential salesman according to his duties, and those who are in immediate contact with the customer are the most likely to benefit from their experience, though this does not guarantee that they may qualify as salesmen.

The training of a selling staff presents difficulties from two points of view, if members are to be recruited from the personnel of the undertaking. On the one side, there are those who have the commercial training, and on the other those with the practical, neither of whom can claim to be fully equipped to act as qualified salesmen. What, therefore, must be done to produce the right type of man desired? In the first place, the gas salesman differs in many respects from those engaged in selling other commodities, though qualifications as to characteristics and training are essentially the same. Whereas the salesman engaged in the selling of a manufactured article does so with a complete knowledge of a limited number of goods as made by the firm he represents, the gas salesman requires to be an encyclopædia of the knowledge of the thousand-and-one purposes for which gas can be utilized; and therein lies the great difficulty.

In view of the fact that men in the gas industry apply themselves with the primary object of qualifying in the theoretical and practical knowledge required to enable them to fill responsible positions, is it any wonder that expert salesmen are scarce? Again, men engaged in the industry undoubtedly gain experience which should help to fit them to qualify as salesmen; yet no man can claim to be competent to act as an expert in all the branches concerning the sale and application of gas as a fuel—hence the need for specializing.

Another factor which particularly affects the activities of the gas salesman, and tends to act as a brake on the sales progress of any undertaking, is that of routine duties. Certain grades of routine work do lend themselves to the possibilities of new orders, but this does not constitute salesmanship—far from it; and unfortunately the gas industry to-day suffers considerable loss of business owing to the lack of a specialized system in sales organization.

SALESMANSHIP COURSES.

If the gas industry is to reap to full advantage the benefits of its unique position in being the main source of fuel supply in the future, it is absolutely essential to specialize courses on a salesmanship basis. While it might be said that such training is already available, this is only true to a limited degree. Why not institute similar official courses under the directorship of the senior association as has been done for manufacture and distribution aspirants? It is not entirely on behalf of the juniors of to-day that these facilities should be considered, but for those of to-morrow, since upon them will rest the responsibility of promoting and carrying through to success the sale and application of gas for every purpose for which heat is required.

INDUSTRIAL HEATING.

It will be evident, from past experience, that the greatest prospects of the future are almost entirely centred on the fuel question, particularly as applied to industrial heating. To-day the industrial load, though improved in recent years, is far from being the main source of revenue it should, and can, be, and for what reason? One would be inclined to say trade conditions do not justify consideration of changes in industrial manufacturing and heating processes, and to a degree this is true; yet the solution to trade revival is cheaper production, but it must be universal.

The use of any class of fuel, irrespective of results, can only be justified according to the price paid, and the cheapest fuel does not always prove to be the most economical. Town gas is offered as the ideal fuel for each and every heating proposition, yet why is it not more extensively used? Because of the price charged. To-day one can say with confidence, "If it is heat that is required, gas is the right and only fuel to use;" but what about the cost? The manufacturer of to-day can buy his fuels in the open market at the most favourable prices, and in many instances about as cheaply as gas undertakings, and, notwithstanding oncost charges per ton, is able to effect a lower working cost than if he uses gas. This, of course, does not pertain in every case, but in most well-organized works it is possible.

The price of coal is not altogether the determining factor in the question of lower price as the only alternative to gas for industrial heating processes; there is also the equally important item of furnace design and efficiencies. Much further experimenting in furnace design requires to be done, to improve on existing efficiencies, and thereby assist the absolute essential of lower running costs, which, in conjunction with more favourable fuel charges, will compel the exclusive use of coal gas. To-day the relative fuel costs are too far apart to induce the manufacturers to incur capital expenditure for the installing of new gas-consuming furnace plant, unless in the case of the smaller units where gas is the only fuel permissible.

One is inclined to labour the point of apparent advantages to be gained by the use of gas in preference to other classes of fuels; and though to some extent these are real, others do not work out in practice as is expected. Why is this? Because the human element is often ignored in calculations. Efficiency, price, and the human element are three vital factors which, taken collectively and treated according to their separate functions, will ensure the maximum results, but not to the extravagant degree that some would have us believe in this or any other problem. The prospects for the junior of to morrow are very promising in many ways, and in my opinion he will require to be something more than a gas fuel expert. It is perhaps not fully appreciated that the subject of industrial heating requires that the gas specialist should have, in addition to his gas experience, an elementary knowledge at least of as many manufacturing processes as possible. Nothing will help him more in his daily conversations on heating problems with responsible heads of manufacturing firms than the fact that he understands the details of their processes. If I have seemed to labour the importance of the industrial application of gas as a fuel, it is because I have absolute faith in the great possibilities of the future, and also with the

knowledge that few have had the privilege of that experience which it has been my good fortune to acquire.

For the benefit of juniors, I submit a few principles which will prove of the utmost value to all public utility men, irrespective of their qualifications and status. There is only one possible way to develop the gas industry to a great and permanent success, and that is on a basis of low cost of production, a minimum cost of distribution, and a minimum selling price to the customer. You should so conduct your affairs with the community as to give your undertaking a reputation for fair and impartial dealing, and, especially if you are acting in an official capacity, preach the same doctrine to your subordinates, and insist upon this policy being carried out in their dealings with the customer. Take the customers into your confidence, not as a favour to them, but as their right. Your income and earning capacity are dependent, primarily, in my judgment, upon the public goodwill; and you cannot get this unless you convince them that you are treating them honestly and giving them a fair deal. If you do not have the privilege of sympathetic public opinion, you are doomed to failure. Finally, punctuality is one of the first rules of business.

Discussion.

Mr. ROBERT GRAY (Hamilton), the Vice-President, opened the discussion, and congratulated Mr. M'Isaac on his address. He hoped all members would help to maintain the high standard set by the juniors of yesterday, and asked whether they realized what those of to-day owed to the founders of the Association. It was an incentive and an inspiration to think of the progress made by many of the juniors of 1904. He welcomed the new education scheme, which would be the means of raising the status of the junior of to-morrow.

Mr. LENNOX (Falkirk) said there seemed to him to be nothing "junior" about the new President. On the contrary, he was a senior speaking to juniors. It was good to look over the list of Past-Presidents, and to note the important positions many of them now held. He said to the junior of to-day: "It is up to you to follow. Create the proper atmosphere, and help to make our industry even more successful."

Mr. J. HALL (Glasgow) was glad the Secretary had arranged for several short papers this session. These would bring out young members, both as paper writers and speakers. With regard to the education scheme, it was gratifying to note that in the Glasgow Technical College two special courses were available this session. The junior ought to determine early what branch he desired to follow, get the best advice, concentrate, and perfect himself. He commended the remarks of Mr. M'Isaac, and congratulated him generally on the address.

Mr. JAMES CUBIE (Glasgow) expressed his thanks to Mr. M'Isaac, and wished him a successful term of office. He thought the education scheme one of the finest things the Institution of Gas Engineers had done.

Various other members joined in congratulating the President on his address.

Mr. JOHN W. M'LUSKY (Glasgow) said that, as an old junior who was at the opening meeting in 1904, he joined them that day to wish them further success. He hoped that many Scottish Juniors of to-day would during the next twenty-one years sit on the Council of the Institution of Gas Engineers.

The President was accorded a hearty vote of thanks.

New Prague Gas-Works.

Contracts for the construction and installation of new gas-works at Michle, Prague, which were passed at the meeting of the Prague City Council in April last, have now been confirmed by the central authorities. The scheme will involve an expenditure of 146,671,290 crowns (close upon £1,000,000), and the main contracts have been given to the Compagnie pour la Fabrication des Compteurs et Materiel d'Usines à Gaz, Montrouge, France; to West's Gas Improvement Company, Ltd., Manchester; and to the firm of Novak and Jahn, Prague.

Safe Gas Tubing.

In a paper on the above subject which he contributed at the annual meeting of the New Jersey Gas Association, Mr. C. D. Frees, of the New York Gas Tubing Company, said that since the production of gas tubing has an important bearing upon the safety of the public, it places a moral responsibility on the maker of it to see that it at least meets the specifications of the American Gas Association. Legislation should be enacted to control the manufacture and sale of gas tubing. He told the members that a safe and dependable tubing could only be made in the following manner: An inner tube of helical metal tubing without a splice or joint in its length is used as a foundation. This is in itself to some extent gas proof. A packing of good rubber compound is then built over it. This rubber should be of such quality as to allow flexibility without breaking or cracking, and devoid, as much as is practical, of foreign substances commonly found in rubber compounds. Then the tubing is dipped in a solution of gelatine, which coats it, making it impervious to gas. His thirty-three years' experience has proved to him that this compound makes the best gas tubing. The next process is the wrapping of the tubing in a fibrous material, to guard against the effect of the heat. A cotton or silk jacket is then braided about the whole to act as a binder. Rubber end pieces of the best quality are afterwards glued on. They must be of the best quality, so as to withstand the wear of pulling over metal gas cocks, and firmly swedged or clamped on with either a nickel-plated or lead ferrule. Mr. Frees finds that tubing thus constructed will withstand, without crushing or showing leakage, the weight of 200 lbs. laid upon a 1-in. length of the tubing.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

Luncheon with the South Bank and Normanby Gas Company.

A report appeared in last week's "JOURNAL" of the business proceedings at the recent meeting of the Association at South Bank, near Middlesbrough, under the Presidency of Mr. S. Shadbolt, who is Engineer and Manager of the South Bank and Normanby Gas Light and Coke Company, Ltd. Great pressure on our space, however, prevented us then from including an account of a luncheon which was given on the occasion, in the Co-operative Hall, by the Chairman and Directors of the Company.

The chair was occupied by Mr. ALFRED E. KITCHIN, J.P., the Chairman of the Company, and among the visitors were Mr. W. Doig Gibb, O.B.E.; Councillor Upton, the Vice-Chairman of the Eston Urban District Council; Mr. Robert G. Shadbolt, brother of the President; Mr. Herbert Lees, of Hexham, hon. member of the Association; Mr. J. Broadhead, Past-Chairman of the Council of the Society of British Gas Industries; and Mr. Walter Dunn, M.I.Mech.E., Secretary to the Institution of Gas Engineers, who specially attended to convey the good wishes of the President (Mr. J. Ferguson Bell, M.Inst.C.E.), who was unfortunately prevented from attending owing to business pressure at Derby. Another desired guest whose absence all regretted was the Hon. Secretary of the Association, Mr. Norman Cox.

After the health of the King had been loyally pledged,

The toast of "The North of England Gas Managers' Association" was given by Mr. R. G. SHADBOLT, of Birmingham. He reminded the company that the Association could boast a continuous and increasing useful existence of 47 years. During that time there had been 43 Presidents, of whom he had personally known no fewer than 33. He hoped to be present at the jubilee gathering of the Association. Their membership totalled 175, and they had undoubtedly upheld the prestige of the gas industry in the north of England, as the Sister Associations in other parts of the British Isles had done in their respective geographical positions. He wished all of them a continuance of prosperity.

Mr. S. SHADBOLT (the President), in acknowledging the toast, expressed deep appreciation of the reception it had been accorded. He recalled the circumstance that he had served the South Bank Company for upwards of ten years, during which period he had been privileged to see the output of gas doubled. It had now reached 152 million c.ft. per annum, and but for the general industrial depression would have been very much greater.

"The South Bank and Normanby Gas Light and Coke Company" was proposed by Mr. W. DOIG GIBB, who knew the works when the President received his appointment there. He had been impressed by the present appearance of them, and congratulated the Company on possessing such a capable Engineer as Mr. Shadbolt had proved himself to be.

Response came from Mr. KITCHIN, who gave a few historical notes about the Company, which was established in the mid-Victorian year of 1866. Thirty years ago the make of gas was 29 million c.ft.; whereas to-day, as the President had said, it was 152 millions. The old Chairman, who happily was with them that day (Mr. Charles Macdonald), could relate some interesting facts about the site of the works when the plant was first laid down. The Directors realized that in their Engineer they had a man of resource, capable of surmounting difficulties, as the members must have seen from their inspection of the works during the morning.

"The Visitors" was proposed by the PRESIDENT; and was acknowledged by Mr. UPTON.

Public Utilities and Co-operation.

In the course of a report made by him to the American Railway Association, Mr. L. F. Eppich, of Denver, expressed his firm opinion that the hostility of former years towards public service institutions is giving way to a realization that the interests of these utilities and the community are interdependent. Because it is a public utility, is no reason why it should furnish service at, or below, cost. He believes that the future will witness an increasingly close co-operation between communities and public service corporations. Their interests are identical in many respects, and continued effort to bring about this result will lead to a closer and happier relation for all. "While," he went on, "co-operation is still a delicate flower in some communities, it can be developed into a sturdy institution with most practical and satisfying results. This is not visionary; it is not impossible. The wonder is that we have not realized it long ago. And, after all, it is the only permanent remedy for community ills."

The Fuel Research Board.—The Board have published further results of their work. One bulletin is a continuation of the "Physical and Chemical Survey of the National Coal Resources (No. 3)," and deals with the Arley Seam of the Lancashire Coalfield. The other is a report of a test carried out on the Parker low-temperature carbonization plant installed at Barugh, Barnsley, at the works of Low-Temperature Carbonization, Ltd. These bulletins, which are obtainable from H.M. Stationery Office, Adastral House, Kingsway, W.C. 2, will be reviewed in a later issue of the "JOURNAL."

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Radiant and Convected Heat.

Sir,—It is particularly interesting to us, and doubtless to all who have the advancement of the industry at heart, to read the remarks of Mr. Arthur H. Barker, B.Sc., B.A., on the subject of gas fires in last week's issue of the "Journal." The decision at which Mr. Barker has arrived appears to confirm the opinion which we put forward in the correspondence which took place in the Technical Press in November and December, 1919. This testimony of an independent authority should make one seriously consider whether the present striving by most of the makers for high radiation efficiency in connection with gas fires is not likely to have a detrimental effect on our business. Everyone who deals directly with the public knows that a very frequent criticism of gas fires is that, while the legs and feet of a person seated in front of the fire may be uncomfortably hot, there is at the same time a feeling of chilliness at the person's back.

Mr. Barker is of opinion that the convection efficiency of the modern gas fire is too low, "so that the fire hardly operates at all in a convective sense." The type of fire which we have introduced provides, in addition to radiant heat, a larger amount of convected heat than is given out by other types. The rise of the air temperature and the consequent feeling of comfort are thereby more readily attained. The champions of high-temperature radiation claim that the necessary convection is obtained from the walls and furniture. This is true if sufficient time is allowed for the absorption of heat, which has to take place first; but to supply both radiant and convected heat simultaneously, and almost immediately after lighting the fire, is surely a much more common-sense, economical, and direct method of effecting the desired result. The past four years' practical experience with this type of fire has confirmed the views expressed by us when we introduced the fire to the gas industry.

"Lemaro."

Birmingham, Oct. 18, 1924.

Sir,—We have read with great pleasure the extract from a lecture given by Mr. Arthur H. Barker, B.Sc., B.A., Wbit.Sch., which appeared on p. 157 of your last issue; and in response to your invitation for comments from makers of gas fires, we would call your attention to the fact that the convection-radiant type of fire so ably and deservedly advocated by Mr. Barker has been manufactured and sold by us in very large quantities for several years. This fire has been advertised regularly by us in your "Journal," and has earned for itself, in a large measure, the popularity which Mr. Barker has foreshadowed for such a type of fire, though his prediction regarding the fortune awaiting manufacturers of such a fire is not so accurately gauged!

The Parkinson Stove Company, Ltd.

Stechford, Birmingham, Oct. 20, 1924.

REGISTER OF PATENTS.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Oct. 15.]

Nos. 23,507 to 24,157.

Bailey, R. W.—"Gas or oil power plant." No. 23,943.
Bartolomeis, R. de.—"Gas furnaces." No. 23,828.
Buxton, R. H.—"Charging horizontal gas retorts." No. 23,681.
Croft, C. M.—See Buxton, R. H. No. 23,681.
Dolphin, J.—"Taps or valves." No. 23,520.
Eve, E. W.—"Gas scrubbers and washers." No. 23,717.
Gas Light and Coke Company.—See Eve, E. W. No. 23,717.
Héreng, A. J. A.—"Distillation of fuel." No. 24,084.
Hislop, R. F.—"Domestic gas fires, &c." No. 23,668.
Howlett & Co., Ltd., M.—See Dolphin, J. No. 23,520.
James, R. W.—"Tar separators." No. 23,738.
Jones, F. W. Salisbury-.—"Distillation of coal, &c." No. 23,743.
Laing, B.—"Distillation of carbonaceous materials." No. 24,048.
Lignojen Maschinen & Apparatebau Ges.—See James, R. W. No. 23,738.
Mendel, S.—"Gas lighting or heating apparatus." No. 24,099.
Metropolitan-Vickers Electrical Company, Ltd.—See Bailey, R. W. No. 23,943.
Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Precipitating chemical compounds on an incandescent body." No. 24,076.
Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Manufacture of hafnium and zirconium compounds." No. 24,125.
Nielsen, H.—See Laing, B. No. 24,048.
Parker, C. H.—See Jones, F. W. Salisbury-. No. 23,743.
Parkinson Stove Company, Ltd.—"Dwellings, &c." No. 24,049.
Radiation, Ltd.—"Gas burners." No. 23,704.
Radiation, Ltd.—"Display devices." No. 23,705.
Soc. Anon. Forni ed Impianti Industriali.—See Bartolomeis, R. de. No. 23,828.
Yates, H. J.—See Dolphin, J. No. 23,520.
Yates, H. J.—See Radiation, Ltd. No. 23,704.
Yates, H. J.—See Radiation, Ltd. No. 23,705.

Restoration of Lapsed Patent.

Notice is given that an order was made on Oct. 9 restoring patent No. 102,626 (106 of 1916) dated Jan. 4, 1916, and granted to Charles Scott-Snell and David Anderson, for "Improvements in gas fires."

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following further notices regarding applications to the Board of Trade under the Gas Regulation Act.

SPECIAL ORDERS.

Aldershot Gas, Water, and District Lighting Company.

An Order under section 10 is to be applied for by the Company to enable them to use scheduled lands for gas purposes.

Morecambe Corporation.

The Morecambe Corporation give notice of their intention to apply for a Special Order to authorize them to use scheduled lands for gas purposes; to make further provision with regard to the supply of gas; to provide for specifying and inspecting pipes, meters, and fittings; to enable them to borrow money; and for other purposes.

Teignmouth Urban District Council.

The Council intend to make application for a Special Order to permit them to use scheduled land for gas-works purposes; to confer general powers upon them with regard to the gas undertaking; and to enable them to borrow money.

METROPOLITAN GAS COMPANIES' OFFICIAL TESTINGS.

The Gas Referees' reports of the official testings for the past quarter under the provisions of the Gas Regulation Act give the following average calorific values for the gas supplied by the Metropolitan Companies named.

Brentford Gas Company.—503·2 B.Th.U. (declared calorific value, 500 B.Th.U.).
Commercial Gas Company.—481·4 B.Th.U. (declared calorific value, 475 B.Th.U.).
Gas Light and Coke Company.—502·2 B.Th.U. (declared calorific value, 500 B.Th.U.).
South Metropolitan Gas Company.—562·4 B.Th.U. (declared calorific value, 560 B.Th.U.).
South Suburban Gas Company.—486·9 B.Th.U. (declared calorific value, 480 B.Th.U.).
Wandsworth, Wimbledon, and Epsom District Gas Company.—475·4 B.Th.U. (declared calorific value, 470 B.Th.U.).

L.C.C. AND THE BRENTFORD STANDARD PRICE.

Application for an Amending Order Recommended.

In a report prepared for submission at yesterday's meeting of the London County Council, the Public Control Committee recommended that application be made to the Board of Trade, under section 1 (3) of the Gas Regulation Act, for an Order reducing the standard price applicable to the Brentford Gas Company.

The Committee pointed out that they had retained the services of an expert, Mr. Arthur Valon, M.Inst.C.E., to advise generally whether, upon the information at present available, there is a *prima facie* case for applying to the Board of Trade for a revision of the standard prices charged for gas by the various Companies supplying in the London area, and, if so, to assist in the preparation of the case should the Council decide to proceed in the matter. They have now had before them Mr. Valon's report with regard to the case of the Brentford Gas Company, who supply gas to parts of Hammersmith and Wandsworth and a small part of Fulham within the County of London, and also to a considerable area outside the county. The Company's present standard price is 17·8d. a therm, and the actual price charged to the consumers 9·8d. a therm. From the figures before them, they are satisfied that, in view of the fall in costs since the Board of Trade in 1921 fixed the present standard price, there is a strong case for a substantial reduction of the standard price applicable to the Brentford Gas Company.

An announcement, they said, has appeared in the Press to the effect that a provisional agreement has been entered into for the amalgamation of the Brentford Gas Company and the Gas Light and Coke Company. It will be necessary to obtain the sanction of Parliament to the proposal before it can be brought into effect. In view of the suggested amalgamation, they have had under consideration the question whether it would be advisable for the Council to postpone applying to the Board of Trade for a reduction of the standard price applicable to the Brentford Gas Company until the terms are known of the Bill which it will be necessary for the Companies to place before Parliament. They are of opinion, however, that postponement on these grounds is inadvisable, inasmuch as the amalgamation will not, as at present proposed, take effect before Jan. 1, 1926.

Blackburn Gas Department's Progress.—Speaking at Blackburn last week, Mr. E. Hamer, J.P., Chairman of the Corporation Gas Committee since 1917, said that during his chairmanship the manufacture of gas in the borough had increased from 720 to 950 million c.ft.—an increase of 32 p.ct. This advance had been achieved by greater efficiency in mains and services, the expenditure on which, during the last five years, had amounted to almost £90,000. The number of appliances in use five years ago was 22,725. This figure had been increased to 43,800 this year, and appliances were still in demand at the rate of over 200 per month. Gas had been reduced in price from 4s. 10d. per 1000 c.ft. in 1918-19 to 3s. 9d. at the present time.

BRITISH SULPHATE OF AMMONIA FEDERATION PRICES.

The British Sulphate of Ammonia Federation, Ltd., in announcing their prices for November and December delivery, write:

"In accordance with our usual practice, we are advancing our prices slightly month by month, but the prices named below are still about 20 p.ct. under the parity of the retail prices for nitrate of soda. In order to avoid risk of disappointment in the spring, it is desirable that a certain portion of home requirements should be bought for early delivery. Neutral sulphate of ammonia, if stored in a dry and suitable building, will keep indefinitely in good condition and without loss. It is understood that quantities purchased at the price stated below will be used for home agricultural purposes only. Prices for January will be announced later.

"We offer to sell sulphate of ammonia for home agricultural use at the following prices:

For November delivery, £14 6s. per ton.
For December delivery, £14 8s. per ton for neutral quality in friable condition, free from lumps, basis 21·1 p.ct. nitrogen.

Delivered to consumer's nearest station or wharf in Great Britain, for prompt cash payment, in lots of 4 tons and upwards. Limited quantities of ordinary quality will be available in some districts, and will be sold at 23s. per ton less than the above prices, basis 20·7 p.ct. nitrogen. Neutral sulphate of ammonia as described above, guaranteed not to contain more than 0·025 p.ct. free acid, will be sold on the basis of 21·1 p.ct. nitrogen, with no charge if over 21·1 p.ct." The allowances are as stated in the "JOURNAL" for July 2, p. 196.

HOT WATER APPARATUS MODEL SPECIFICATION.

Drawn up by a Committee Appointed by the Minister of Health.

There has been issued for official use a Model Specification of Water Pipes and Fittings prepared by a Committee appointed by the Minister of Health to consider and advise him on questions relating to: (*a*) The construction and standardization and testing of water pipes and fittings; and (*b*) bye-laws or regulations for preventing the waste, undue consumption, misuse, or contamination of water. Copies may be obtained from H.M. Stationery Office, Adastral House, Kingsway, London, W.C., at the price of 3d. net.

It is pointed out that new bye-laws relating to water fittings have for some time been in course of preparation on behalf of water undertakers; and the proposals were arousing some anxiety among owners of property and others. The position with regard to the manufacture of water fittings also was not satisfactory, particularly as makers were not certain as to what was likely to be required of them. In view of these conditions, the Committee mentioned—representative of all the interests affected—were appointed by the Minister of Health in 1923. The members included Mr. H. E. Stilgoe, M.Inst.C.E. (Chief Engineer to the Metropolitan Water Board), and various Corporation Water Engineers.

The specification recommended by the Committee indicates what are considered to be the minimum requirements necessary in the construction of water fittings commonly in use in order to prevent waste of water and undue expense for repairs and renewals. The details set out have been settled on the assumption that the materials and workmanship throughout will be of good quality. The Committee realize that some deviations may be desirable in localities where the water supply has unusual characteristics.

As regards standardization, the Committee hope that the specification now submitted will do much towards uniformity in the important parts of water fittings; but they do not consider that it is advisable to endeavour to enforce standardization, at any rate at present.

As to testing of water fittings, the Committee consider that it would be well that all water fittings should be tested before they are fixed; but they are not prepared to recommend that at the present time legislation should be introduced to make testing compulsory. They are of opinion, however, that it would be of great benefit if a sufficient number of testing stations were set up under the joint management of water undertakers and manufacturers in which there would be a uniform standard of testing. They believe that the stamp of any testing station of this kind on a water fitting would ensure its acceptance by all water undertakers, unless in a particular locality special requirements were necessary because of the composition of the water or other exceptional local conditions.

The next task before the Committee is to consider what modifications should be made in the model form of bye-laws relating to water fittings now in use; and measures have already been taken to this end. It has been thought well, however, to publish the specification at once, without waiting for the completion of the work of the Committee, because it is important that manufacturers and others should know as soon as possible the result of the deliberations of the Committee with regard to the specification for water fittings.

Section V. of the specification is in the following terms.

Hot Water Apparatus.

(i) All taps and fittings connected with any geyser* or other hot water apparatus, which will be under water pressure, should comply as regards strength, &c., with the general provisions in this specification.

(ii) Every hot water supply apparatus (including geysers), and every gas producer, gas engine, oil engine, or other apparatus in or by which water supplied by the undertakers is heated, should be supplied from a cold water feed cistern, or the cold water supply should be controlled by a bib tap or stop tap, and should not be connected directly to the water contained in the apparatus, but discharge into the air above it.

Provided that this paragraph shall not apply to any electrically heated apparatus properly designed and controlled as regards both water and electricity; or to any gas-heated geyser fitted with an efficient inlet valve automatically controlling both gas and water, so that no gas (other than through a small by-pass) can be released by the apparatus unless water is flowing through the geyser; or to small gas-heated apparatus (other than geysers) constructed with a free water outlet.

(iii) The normal capacity of the cold water feed cistern, except where the hot water apparatus is used solely for the purpose of warming buildings, should be not less than 25 gallons in cases where such cistern is for use only in connection with the hot water apparatus or other apparatus in which water supplied by the undertakers is heated. If the cold water storage cistern is used as a feed cistern for the hot water apparatus, any draw-off pipe, other than that supplying the hot water apparatus, should be connected at such a level as to leave (except as above provided) not less than 25 gallons of water always available for supply to the hot water apparatus only.

(iv) The outlet from the cold water feed cistern should be at, or not more than 2 in. above, the bottom of the cistern, and the connecting pipe should deliver water to the hot water apparatus only.

(v) The hot water cylinder or tank should be of galvanized iron, hard rolled copper, or other equally suitable material, and no copper loaded with lead should be used.

(vi) The thickness of the plates of which the cylinder or tank is made should be appropriate to the pressure to which the cylinder or tank will be subjected under normal working conditions.

(vii) If the cylinder or tank be of galvanized iron, it should be made from sheets of a thickness of not less than 12 I.S.W.G. If the cylinder be of copper, the bottom plate should be of not less thickness than 18 I.S.W.G., and the remainder of the cylinder should be of not less thickness than 20 I.S.W.G.

(viii) The cylinder or tank should be tested to double the pressure to which it will be subjected under normal working conditions, and it should be clearly marked with the pressure to which it has been tested.

(ix) No tap or other means of drawing off hot water (other than a screwed plug or lockable tap for emptying the system for cleaning or repair) should be connected to any part of the hot water system below the top of the hot water cylinder or tank in such a way that the level of the water in the cylinder or tank can be lowered.

(x) The primary flow and return pipes between the boiler and the cylinder or tank shall be at least 1 in. in internal diameter. Provided that in the case of gas-heated apparatus the internal diameter of the return pipe might be not less than ¾ in., and, if at the point of connection with the cylinder or tank the return pipe be formed of a corrosion-resisting alloy, the internal diameter might at that point be further reduced to ½ in. The feed pipe from the cold water feed cistern to the cylinder or tank should be not less than ¾ in. in internal diameter.

(xi) The expansion pipe should be not less than ¾ in. in internal diameter, and should be carried up so that the highest part of the pipe will be at least 1 ft. 6 in. above the water-line of the cold water feed cistern for every 25 ft. in height between such cistern and the boiler.

(xii) An efficient safety valve should be fitted to the boiler or to one of the primary circulating pipes as close to the boiler as practicable, except in the case of gas-heated apparatus fitted with an efficient thermostatic control.

* It is essential that all geysers and similar gas-heated water apparatus should have an efficient chimney or flue pipe, fitted with a baffle as high in the room as possible, discharging into the open air and having a suitable terminal fitted.

TRADE NOTES.

Gas Fires and Radiators.

Messrs. General Gas Appliances, Ltd., of Guide Bridge, Manchester, have published an illustrated list of their fires and radiators which they are placing on the market for the 1924-25 season.

"Send to Barimar."

This is the title of a booklet just issued by Messrs. Barimar, Ltd., which deals fully with the Barimar welding repair service. A copy will be sent to any reader of the "JOURNAL" on application to Messrs. Barimar, Ltd., of 14-18, Lamb's Conduit Street, London, W.C. 1.

Important Order for Messrs. Vickers, Limited.

The Foundation Company, Ltd., acting on behalf of Messrs. Lafarge, have placed an order with Messrs. Vickers, Limited, Barrow-in-Furness, for the first clinker grinding plant, comprising tube mills, installed in this country in connection with the manufacture of "Ciment Fondu."

The "Hotchkiss Circulator.

An instructive booklet entitled "The Transfer of Heat to Water" has been issued by Arthur Ross, Hotchkiss & Co., Ltd., of No. 1, Glengall Road, Old Kent Road, London, S.E., 15, in which are indicated the advantages to be derived in boiler practice from the installation of the "Hotchkiss" circulator.

Lubrication.

Two interesting booklets—"The Lubrication of Steam Turbines," and "The Lubrication of Diesel and other types of Heavy Oil Engines"—have recently been published by Messrs. Sterns, Ltd., of Royal London House, Finsbury Square, London, E.C. 2. These contain much information on the subject of efficient lubrication; and the firm are prepared to send copies free and post free to any readers of the "JOURNAL"

South Suburban Capital Largely Over-Subscribed.—In connection with the offer for sale of £100,000 of 5 p.ct. ordinary stock of the South Suburban Gas Company, under conditions that were announced in the "JOURNAL" a fortnight ago, we learn that tenders at an average price of 103·8 p.ct. have been accepted, and letters of allotment have been posted. The issue was applied for nearly four times over. It is worthy of note that the South Suburban Gas Company introduced a co partnership scheme some thirty years ago—an arrangement which has undoubtedly been mutually advantageous to consumers, stockholders, and employees.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The market professed to a more cheerful tone at the end of the week, though it was more sentiment than anything tangible in the way of increased trade or improved prices. Rather more inquiries were circulating for the rest of the year and early next, though not very much in the way of forward sales was effected, buyers' ideas being still considerably below prices at which sellers are prepared to close. The latter maintain that there is no margin left for further reductions.

The trouble at the Dunston Staiths subsided on Monday, the men having been out only a few hours.

The run on Durham unscreened bunkers, as anticipated last week, was short-lived, and supplies are now plentiful again, though, owing largely to orders booked at the time, best qualities have been able to maintain up to the present a 19s. quotation.

Gas coals have been fairly steady, and prices are maintained at 21s. 6d. to 22s. for Wear Specials, 20s. to 21s. for best qualities, according to individual collieries' positions, and 17s. 9d. to 18s. 6d. for others. This section still remains the firmest in the market, at any rate so far as better makes are concerned.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

Gas coals in the open market in Yorkshire and Lancashire are dull, though with the approaching winter there should be an improvement in this direction during November.

House coal is not in the same keen demand that prevailed in September, probably owing to an anticipated advance in prices, and the weather continues mild. Collieries have not yet felt an appreciable falling off, but merchants report that orders are not coming in unduly.

There is no improvement in the industrial outlook, and until after the election there will, apparently, be little confidence in business circles. Supplies of all steam fuels, with the exception of the better grades, are, therefore, at very low figures.

The export demand is weaker, possibly owing to German competition in respect to supplies to Scandinavia and the other Continental countries. How long this will last is problematical, and will largely depend on the consumption by Germany of a greater proportion of her own coal than at present when the advance under the Dawes Report has been made to enable the industries of Germany to revive. The larger collieries are working satisfactorily, though some are accumulating stocks, but the smaller pits are not so well placed.

The prices at Hull at the week end were :—Bunkers : Yorks, Derby, and Notts large screened steam, f.o.b. Humber ports, 18s. to 21s. per ton. Cargo for export, f.o.b., usual shipping ports: Best Yorks hards, Association, 23s. 9d. ; Derby best hards, 24s. to 25s. ; West Yorks Hartleys, 20s. to 23s. ; South Yorks washed doubles, 19s. ; ditto singles, 18s. to 18s. 3d. ; dry doubles, 15s. 6d. to 16s. 6d. ; South Yorks washed smalls, 15s. 3d. to 16s. ; Derby slack, 1 in., 11s. ; South Yorks rough slack, 11s. 6d. to 12s. ; gas coke, 32s. to 36s. ; foundry furnace coke, 20s. to 21s. ; washed smithy peas, 21s. 6d. to 26s. ; washed steam thirds, 19s. 3d. ; South Yorks washed trebles, 24s. per ton.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

At some of the pits further restriction of working is necessary to keep stocks within bounds. Gas undertakings have so completely used up their storage that with consumption below expectations they are hardly able to take full contract deliveries. There is a great deal of coal at the pitheads awaiting buyers. The owners would be glad to relieve the congestion at some sacrifice, but in the circumstances there is no market. Trade in household coals is decidedly slower. A few days of severe weather would stimulate it ; while mild autumn weather lasts, no improvement is to be looked for. Winter supplies put in at summer prices limit the extent of the market ; but the main point is the smallness of consumption. This applies in the domestic and industrial branches alike. Values are drooping. Slacks are quite a shilling cheaper, and in regard to all smalls collieries are compelled to modify their attitude. In the Birmingham area pits are still working full time. This is attributed to the comparative activity of the country trade.

Newcastle-upon-Tyne and Gateshead Gas Order.—The report is unavoidably held over of an inquiry last week by Mr. H. C. Honey (Director of Gas Administration at the Board of Trade) into an application by the Newcastle-upon-Tyne and Gateshead Gas Company for a Special Order to enable them to acquire the undertakings of the Walker and Wallsend Union Gas Company and the Chester-le-Street Gas Company, Ltd., and to extend the area of supply.

Lights Ancient and Modern.—At the invitation of Mr. Walter T. Dunn (Secretary of the Institution of Gas Engineers), Mr. W. J. Liberty (Hon. Secretary of the Institution of Public Lighting Engineers), recently gave an illustrated lecture entitled "Lights Ancient and Modern," at the Streatham Hill Congregational Church Sunday School, in aid of the funds of the school. The chair was taken by Alderman George Harvey, J.P., L.C.C. (Mayor of Holborn). There was a good and appreciative audience. At the conclusion of the lecture, the Mayor stated that he had become acquainted with Mr. Liberty some time since, when presiding at a conference at the Holborn Town Hall of the Institution which Mr. Liberty represented. He was sure those present had enjoyed the lecture, which was the result of Mr. Liberty's expert knowledge.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *Oct.* 20.

On the London market, pitch remains in a quiet position, as the makers are not urgent as sellers. It is not easy to name a price that would represent the situation, but it is felt that in the provinces the value is recovering after the recent "bear" attack. Possibly an offer of 50s. net might induce some London makers to sell a little. Creosote is fairly steady at about 6d. net per gallon in bulk at makers' works. Other products are unchanged.

Tar Products in the Provinces.

Oct. 20.

There has been little alteration in the market for tar products during the past week. Pitch is certainly firmer on this side, probably owing to dealers covering sales made some time ago, but Continental buyers report they are still purchasing Continental makes of pitch at figures considerably below the English prices ruling. Creosote is steady, but without any alteration in price. Water-white products are quiet, but appear to have a rather firmer tone than was the case a few weeks ago. Naphthalene and carbolic are still neglected, while cresylic remains dull.

The average values for gas-works products during last week were: Gas-works coal tar, 26s. 3d. to 31s. 3d. Pitch, East Coast, 41s. 6d. to 44s. f.o.b. West Coast—Manchester, 36s. 6d. to 38s. 6d. ; Liverpool, 37s. 6d. to 40s. ; Clyde, 40s. to 41s. Benzole 90 p.ct., North, 1s. 2d. to 1s. 3d. ; crude 65 p.ct. at 120° C., 9d. to 10d. naked at makers' works ; 50-90 p.ct., naked, North, 1s. 2d. to 1s. 3d Toluole, naked, North, 1s. 2d. to 1s. 3d., nominal. Coal tar crude naphtha in bulk, North, 7d. to 7¼d. Solvent naphtha, naked, North, 1s. to 1s. 1d. Heavy naphtha, North, 1s. to 1s. 1d. Creosote, in bulk, North, liquid, 5d. to 5¼d. ; salty, 4⅞d. to 5d. ; Scotland, 5d. to 5⅛d. Heavy oils, in bulk, North, 7d. to 7¼d. Carbolic acid, 60 p.ct., 1s. 7¼d. to 1s. 8¼d. prompt. Naphthalene, £13 to £15 ; salts, £5 to £7, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal ; "B" unsaleable.

Extensions at the Pleck Gas-Works.—The Walsall Corporation Gas Committee are asking for sanction to an expenditure of £27,800 for constructing seven additional beds of horizontal retorts at the Pleck Gas-Works, and for installing storage hoppers and a complete coal-handling plant.

Bombay Lighting.—The 1923 review of the Bombay Corporation states that 7393 gas lamps, including 303 high-pressure burners of various candle powers, were maintained during the year, as compared with 7322 lamps, including 291 high-pressure burners, in the previous year. The scheme of improving the lighting of residential roads of 40 ft. and less by converting the 60 c.p. vertical gas-burner lamps into 80 c.p. inverted ones was taken in hand, and out of 3000 lamps 1500 were thus converted during the year. The "Littleton" gas lamp was tried during the year, and was found to be both economical and efficient. Orders have been placed for 62 of these lamps of varying powers.

More Effects of the Bailhache Judgment.—The Bailhache judgment is to cause the loss to the Liskeard Town Council of two valued members. At the Council meeting last week, the Mayor (Mr. W. F. Young) received the resignation of Mr. J. C. Isaac, who explained that, as Secretary and a shareholder of the Gas Company, which had contractual relations with the Council, he felt his position might be affected by the judgment. Mr. W. H. Huddy announced that, as a Director of the Gas Company, he did not intend to seek re-election on Nov. 1, when his term of office expired. The Mayor observed that it was very unfortunate that so many prominent business men interested in the affairs of the borough should thus be debarred from rendering service to the community. Members paid a tribute to the services of Mr. Isaac.

New Spiral Holder for Middlesbrough.—The Middlesbrough Gas Committee have recommended the acceptance of the tender of the Furness Shipbuilding Company, Ltd., Haverton Hill-on-Tees, for the erection of a spiral gasholder and steel tank, in accordance with Mr. W. Doig Gibb's specification, at a price of £37,000, subject to the firm agreeing to extend the period provided for in the specification for the guarantee of such work from twelve months to two years. The Gas Committee have passed a special resolution expressing their complete satisfaction with the services rendered by Mr. Doig Gibb, and asking him to act as Consulting Engineer until the whole of the work is completed. A clerk of works is to be advertised for to undertake the supervision of the erection of the holder and tank and also the foundation work ; and the applications are to be submitted to Mr. Doig Gibb for his recommendation.

Failure of Gas Apparatus Business.—At the London Bankruptcy Court on Friday last the public examination was concluded of George Light and Cyril Henry Light, lately carrying on business in partnership as the Visso Lighting Corporation, at No. 24, Lower Marsh, S.E., and at No. 35, Gray's Inn Road, W.C. The Receiving Order was made on June 24 last, on the petition of a creditor. A joint statement of the debtors' affairs disclosed ranking liabilities £1579, and net assets £136. The Official Receiver states that in May, 1920, the debtors commenced business in partnership as dealers in gas burners and accessories at No. 17, Cloth Fair, E.C., under the style of the Visso Lighting Company. In September, 1920, they removed to more convenient premises at No. 24, Lower Marsh, Lambeth, S.E. ; but in consequence of a slump in trade they ceased trading in June, 1923. On June 22, 1923, they registered a Company called the Visso Lighting Corporation, Ltd., with a nominal capital of £500 divided into shares of £1 each. The Company purchased the assets for £400, which money the bankrupts used to discharge part of their liabilities. They attributed their insolvency to depreciation in value of goods, slump in trade, heavy cost of advertising, and conversion of lighting to electricity by several of their customers.

STOCK MARKET REPORT.

In financial circles the event of the week was the issue of the much talked of German Loan. The New York and Dutch issues had been oversubscribed, and it was a foregone conclusion that the lists in respect of the British portion would be open for a brief period only. In fact, within a few minutes the Loan was oversubscribed. Home politics were again prominent. The Stock Exchange is firmly convinced that the Socialists will be dislodged from office at the coming election, but Underwriters at Lloyd's are inclined, after last year's experience, to be cautious, and rates for election insurance are on the high side. The prospect of a more stable Government is, however, having a good effect on prices in most markets; not only was the market for Home Government stocks in a healthy state, but India and Colonial issues showed marked improvement. Large purchases were reported of Queensland 5 p.ct. stock, which now stands at 2 premium on the issue price of 97½.

A greater interest was shown in Industrials. Textile shares and Tobaccos were again outstanding—a good deal of attention being given to Imperial Tobacco on rumours of increased dividends. Holders of Austin Motor shares will be interested in the forthcoming re-organization scheme which has led to substantial improvement in both the debenture and preference shares.

The tone of the Gas Market continues to be optimistic. Prices remain steady, and buyers are plentiful. The only variation of note is a rise of 2 points in South Suburban ordinary; and it is satisfactory to note that this Company's recent issue of £100,000 ordinary stock has been very largely oversubscribed.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 64, 64½, 65, Cape Town 7⅛, European 8⅛, Gas Light and Coke 94½, 94⅝, 95⅞, 95, 4 p.ct. preference 79, 3 p.ct. debenture 60¾, Imperial Continental 173, 173½, 174½, Primitiva 9s. 9d., 9s. 10⅛d., 10s., 10s. c¾d., 10s. 1⅛d., 10s. 3d., 4 p.ct. debenture (1911) 54⅞, 55½, South Metropolitan 99, 99¾, 3 p.ct. debenture 60¾, South Suburban 105⅝, Wandsworth (Wimbledon) 111½. Supplementary prices, Leatherhead 5 p.ct. 101$\frac{15}{16}$, Rochester, Chatham, and Gillingham 84, 84½.

On Tuesday, Bombay 5½, Brentford "B" 112½, Brighton "A" 126, Bristol 5 p.ct. 91½, Commercial 4 p.ct. 92½, Gas Light and Coke 94, 94½, 94⅛, 94⅝, 94¾, 95, 4 p.ct. preference 79½, 80, 80½, 3 p.ct. debenture 61½, Hongkong and China 16$\frac{7}{32}$, 16½, Imperial Continental 173¾, Montevideo 58½, Primitiva 9s. 9d.. 10s., 10s. 1½d., 10s. 3d., 4 p.ct. debenture (1911) 54¾, Sheffield "B" 100, South Metropolitan 99, 99¼, 99⅜, 100, Southampton 5 p.ct. 86, 86½, Tottenham "B" 100¼, 101½, Tuscan 8s., Wandsworth "B" 115, (Wimbledon) 111½, 112½, 3 p.ct. debenture 58½. Supplementary prices, Colombo 11$\frac{7}{32}$, 11½.

On Wednesday, Brentford 5 p.ct. preference 91, Gas Light and Coke 94, 94⅛, 94⅜, Imperial Continental 173, 175, 3½ p.ct. debenture 72, Primitiva 9s. 9d., 9s. 10½d., 10s., South Metropolitan 99⅜, 99½. Supplementary prices, Newport (Mon.) 5 p.ct. 80.

On Thursday, Bournemouth "B" 12$\frac{9}{16}$, Brentford "B" 112½, 5 p.ct. preference 92, Brighton and Hove original 173, "A" 127, British 117, Continental Union 7 p.ct. preference 90½, European 8$\frac{3}{16}$, 8$\frac{7}{32}$, 8⅛, 8⅜, Gas Light and Coke 94, 94⅛, 94¼, 3½ p.ct. maximum 62, 62½, 4 p.ct. preference 80, 80½, Imperial Continental 173½, 175, Primitiva 9s. 7½d., 9s. 9d., South Metropolitan 99½, 99⅝, 99¾, Tottenham "B" 101½, 101⅝, Wandsworth "B" 116.

On Friday, Aldershot "C" 82, Alliance and Dublin 64½, 65⅛, Bournemouth "B" 12$\frac{11}{16}$, 12¾, Brighton and Hove 175, Bristol 92, Continental Union 7 p.ct. preference 91, Gas Light and Coke 94, 4 p.ct. preference 80, 80½, 3 p.ct. debenture 61, Imperial Continental 176, Primitiva 9s. 9d., 9s. 10¼d., 10s., 4 p.ct. debentures 79, South Metropolitan 99, 99⅝, 3 p.ct. debenture 61½.

Conditions in Lombard Street were as usual easier at the week-end, although funds were not plentiful. The rate for overnight advances ranged from 3½ p.ct. down to 2⅝ p.ct. Treasury Bills tendered for were obtained on better terms, the average rate being £3 14s. 11·17d. p.ct., a little over 1s. 2d. p.ct. higher than on the previous Friday.

The Foreign Exchanges were quieter than of late. Francs cheapened and finally closed at 85.70. The Brussels rate was 25c. higher at 93.35, and Italian lire closed at 102.85. Sterling on New York rose to 4.49$\frac{31}{32}$.

Silver declined as the result of some Chinese selling, the cash price being 35⅝d.

The Bank rate is 4 p.ct., to which it was raised from 3 p.ct. on July 5, 1923. Bankers' deposit rates are 2 p.ct. The deposit rates of discount houses are 2 p.ct. at call and 2½ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Oct. 17.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C.	80—83	..	82
235,492	,,	,,	4	4	Do. 4 p.c. Pref.	68—72	..	..
1,551,868	,,	Sept. 25	6	6½	Alliance & Dublin Ord.	61—66	..	64—65½
374,000	,,	July 10	4	4	Do. 4 p.c. Deb.	63—68	..	..
300,000	5	May 22	8	8	Bombay, Ltd.	5—5½	..	5½
100,000	10	Aug. 14	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
383,110	10	,,	7	7	Do. B 7 p.c.	12¼—13	..	12$\frac{9}{16}$—12¾
150,000	10	,,	6	6	Do. Pref. 6 p.c.	10½—11¾	..	..
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb.	54—59	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	74—79	..	..
992,045	,,	July 10	6$\frac{1}{10}$	6$\frac{1}{10}$	Brentford A Con.	110—115	..	..
990,500	,,	,,	6⅛	6⅛	Do. B New	110—115	..	112⅛
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	87—92	..	91—92
306,690	,,	June 12	4	4	Do. 4 p.c. Deb.	75—80	..	..
181,337	,,	,,	—	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	..
214,740	,,	Aug. 28	11½	11½	Brighton & Hove Orig.	170—175	..	173—175
244,200	,,	,,	8½	8½	Do. A Ord.	125—128	..	126—127
1,287,500	,,	July 24	5	5	Bristol 5 p.c. max.	91—92a	..	91½—92
855,000	,,	Sept. 25	7	8	British Ord.	115—120	..	117
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	118—123	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	May 22	6	8	Cape Town, Ltd.	6½—7⅛	..	7⅛
100,000	10	Apr. 24	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb.	71—76	..	..
626,860	,,	July 24	6	6	Cardiff Con. Ord.	97—100	..	..
237,860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	103—106	..	..
157,150	,,	Aug. 14	6½	5	Chester 5 p.c. Ord.	86—91b	..	..
1,513,280	,,	July 24	6	6	Commercial 4 p.c. Cap.	91—94	..	92½
560,000	,,	,,	6	6	Do. 3½ p.c. Cap.	91—94	..	..
475,000	,,	June 12	3	3	Do. 3 p.c. Deb.	56—59	..	..
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	38—43	..	..
200,000	,,	June 12	7	7	Do. 7 p.c. Pref.	87—92	..	90½—91
660,000	,,	Aug. 28	6½	6½	Croydon sliding scale	100—103	..	..
284,975	,,	,,	5	5	Do. max. div.	84—87	..	..
492,270	,,	Aug. 28	9	6	Derby Con.	107—110	..	..
55,000	,,	July 10	4	4	Do. Deb.	74—76c	..	..
209,000	,,	Oct. 9	5	5	East Hull 5 p.c. max.	—*	..	..
1,002,180	10	July 24	2	6	European, Ltd.	7⅛—8⅛	..	8⅛—8⅛
16,503,045	Stk.	Aug. 14	5½	5½	Gas Light & Coke 4 p.c. Ord.	94—96	..	94—95
2,600,000	,,	,,	3¾	3¾	Do. 3½ p.c. max.	61—64	..	62—62½
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	78—81	..	79—80½
4,761,930	,,	June 12	3	3	Do. 3 p.c. Con. Deb.	60—63	..	60½—61½
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Sept. 11	6½	6½	Hastings & St. L. 5 p.c. Conv.	95—100	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	75—80	..	..
70,000	10	Sept. 25	10	10	Hongkong & China, Ltd.	15½—16½	..	16$\frac{3}{32}$—16½
86,600	Stk.	Aug. '14	10	10	Hornsey 7 p.c.	138—143	..	..
1,976,000	,,	May 22	10	30	Imperial Continental Cap.	172—177	..	173—176
263,950	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	68—71	..	72
235,242	,,	Aug. 14	6½	6½	Lea Bridge 5 p.c. Ord.	95—100	..	..
2,127,340	,,	Aug. 14	5½	5½	Liverpool 5 p.c. Ord.	91—92b	..	92
600,000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref.	102—105b	..	..
165,736	,,	Aug. 28	8	9	Maidstone 5 p.c. Cap.	120—125	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb.	53—58	..	..
75,000	5	,,	5	7	Malta & Mediterranean	3½—3¾	..	..
541,920	Stk.	June 12	4	4	Montevideo, Ltd.	55—60	..	58½
1,875,892	,,	July 24	5½	5	Newcastle & Gateshead Con.	82½—83¼d	..	83
250,166	,,	,,	4	4	Do. 4 p.c. Pref.	74—75d	..	..
529,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb.	70—72d	..	..
15,000	10	Aug. 28	11	11	North Middlesex 10 p.c.	15½—16½	..	..
75,940	10	,,	7$\frac{7}{16}$	7$\frac{7}{16}$	Do. 7 p.c.	11½—11¾	+½	..
300,000	Stk.	May 8	9	7	Oriental, Ltd.	99—102	..	..
138,120	,,	June 26	7$\frac{7}{8}$	7$\frac{7}{8}$	Plym'th & Ston'house 5 p.c.	112—117	..	..
60,000	50	Aug. 28	13	13	Portsea Island B	99—102	..	..
100,000	50	,,	12	12	Do. C	95—100	..	..
2,289,909	1	—	—	—	Primitiva Ord.	9/6—10/6	..	9/9—10/3
341,400	100	June 2	4	4	Do. 4 p.c. Red. Deb.	76—79	..	79
600,000	Stk.	July 24	4	4	Do. 4 p.c. Red. Deb. 1911	53—56	..	54½—55½
220,335	,,	June 26	4	4	Do. B. Aires 4 p.c. Rd. Db.	54—57	..	..
321,670	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	54—57	..	..
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref.	6½—7½	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	41—43	..	..
270,000	Stk.	Aug. 28	5/8/4	5½	Sheffield A	101—103e	..	..
419,968	,,	,,	5/8/4	5½	Do. B	101—103e	..	100
1,047,000	,,	,,	5/8/4	5½	Do. C	101—103e	..	..
90,000	10	June 12	6	8	South African	7—9	..	..
6,609,895	Stk.	Aug. 14	6½	5	South Met. Ord.	98½—100½	..	99—100
102,580	,,	July 10	5	5	Do. Red Pref.	96—98	..	..
1,895,445	,,	,,	3	3	Do. 3 p.c. Deb.	59—62	..	60½—61½
734,000	,,	Sept. 11	6½	6½	Do. 6½ p.c. Red. Deb.	101—103	..	..
91,500	,,	Aug. 28	8½	8½	South Shields Con.	134—136d	..	..
1,087,795	,,	Aug. 14	6½	6½	South Suburban Ord. 5 p.c.	105—108	+2	105½
368,837	,,	June 26	5	5	Do. 5 p.c. Deb.	93—98	..	..
647,749	,,	May 8	5	5	South'mpt'n Ord. 5 p.c. max.	85—88	..	86—86½
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	73—78	..	..
250,000	,,	Aug. 28	7	7	Swansea 7 p.c. Red. Pref.	101½—103½	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	..	..
120,000	,,	July 24	8	8	Tottenham District A 5 p.c.	116—119	..	..
882,275	,,	,,	6½	6½	Do. B 3½ p.c.	99—102	..	100½—101½
181,255	,,	June 12	4	4	Do. 4 p.c. Deb.	76—80	..	..
258,251	,,	Aug. 28	7/14/4	5	Tynemouth Con. and New	84—86d	..	..
30,000	,,	July 10	9½	9½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	135—140	..	..
255,636	,,	,,	7½	7½	Do. B 3½ p.ct.	113—118	..	115—116
108,075	,,	,,	6/7/9	6/9/6	Do. C	96—101	..	..
240,865	,,	,,	6/7/9	6/9/6	New Ordinary	..	..	..
352,000	,,	,,	7½	7½	Wimbledon 5 p.ct.	110—115	..	111½
98,000	,,	,,	7½	7½	Epsom 5 p.ct.	115—120	..	..
88,416	,,	June 26	3	3	3 p.c. Deb.	55—60	..	58½

Quotations at:—*a*.—Bristol; *b*,—Liverpool. *c*.—Nottingham; *d*.—Newcastle; *e*,—Sheffield. * Ex; div;

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The Month of Death.

Why so many people die in November was explained recently to the Sunlight League by the eminent specialist, Sir Maurice Abbot Anderson, M.V.O., M.B., B.S., a member of the Council of the Coal Smoke Abatement Society. "Mentally," he said, "fogs and gloomy days cause severe depression which lowers vitality and lays the system open to invasion by any prevalent disease; and there is no doubt that this lowering of vitality is one of the chief causes of the seasonal increase in the death-rate during the autumn and winter months. There were thick fogs in and around London on Nov. 24 and 25 last year; and within a fortnight afterwards, the number of deaths from bronchitis and broncho-pneumonia increased from 138 to 251. It is true that there has been a considerable increase in smoke abatement during the past few years, and this fact is rightly attributed to the increasing use of gas and electricity for cooking and heating purposes, as well as to the improvement in the means of combustion in respect of factories. In 1900 the number of cookers and grillers supplied to the public by the gas industry was 837,253. Last year the number amounted to 5,133,190. The factory chimney," Sir Maurice continued, "is not nowadays the worst offender, though there is still room for great improvement in that direction. It is undeniable that the chief responsibility for atmospheric pollution rests with the domestic chimney; and the improved atmospheric conditions resulting from the increased use of electricity and gas markedly substantiate the desirability, and, indeed, the importance, of employing only smokeless fuels for all purposes."

Oxford Gas Capital Issue.—Tenders for the £79,498 of 5 p.c. perpetual debenture stock which Messrs. A. & W. Richards offered for sale for the Directors of the Oxford Gas Light and Coke Company amounted to a total of £132,770, and ranged from par down to the minimum of £95 per £100; the average price obtained being £95 14s. The lowest tender to secure an allotment was at £95 3s. p.ct.

After Twenty-Nine Years.—The Amble and Warkworth Gas Light and Coke Company, Ltd., held their annual meeting of shareholders on Saturday, the 11th inst., when a dividend of 2s. per share was declared. This is the first dividend paid for 29 years, and shows that the Company have improved their financial position, notwithstanding severe competition from the Council electricity undertaking, which is being run at a loss to the ratepayers, and part of which loss is, of course, paid by the Gas Company.

Gas Stealing at Lisburn.—Mr. A. S. Brooke, Manager of the Lisburn Gas-Works, was one of the principal Crown witnesses in a prosecution at Belfast Quarter Sessions against Thomas C. Baillie, who was sentenced to three months' imprisonment for having stolen, over a period of six months, a quantity of gas belonging to the Lisburn Urban District Council. Baillie had previously been fined £200 for the manufacture of poteen. Mr. Brooke explained to the Court how the gas supply was tapped before it reached the meter.

Aldershot Gas Capital Issue.—By order of the Directors of the Aldershot Gas, Water, and District Lighting Company, Messrs. A. & W. Richards are offering for sale by tender £60,000 of 4 p.ct. consolidated irredeemable preference stock, at a minimum price of £70 per £100, at which the yield will be £5 14s. 4d. p.ct. Tenders must be forwarded to the firm at No. 37, Walbrook, E.C., not later than 11 o'clock to-morrow (Thursday). The Company have recently obtained powers from the War Office for the supply of gas for cooking and heating purposes to the various messes, married quarters, and institutions in the Aldershot Military Command. From other sources demands for new supplies, and heating and cooking appliances, are continually being received, and it is to enable the Company to extend the works, plant, and mains to meet these demands that the capital now being offered is required. A co-partnership scheme has been in operation for several years, and a large number of the Company's employees have become stockholders.

Gas in Leeds Shopping Week.—Mr. C. S. Shapley, General Manager and Engineer to the Leeds Gas Department, never allows a chance of advertising gas to slip by, and therefore it is no surprise to know that the City Gas Department are making special displays in connection with the Leeds Shopping Week, which opened on Oct. 18 and continues to Oct. 25. Coincident with the shopping week there is an Ideal Home Exhibition at the Fenton Street Drill Hall, where the Gas Department have a stand, and where much of the special lighting for other exhibitors—as in the case of previous exhibitions—is by gas. The Shopping Week is one of the biggest things of its kind ever held in the North of England. Processions took place on Monday, Tuesday, and Thursday last week; and the city has been decorated. The inauguration on Saturday was by the Lord Mayor. There are many competitions open to traders and the public; and specially decorated and illuminated tramcars have been provided to attract people into the city from the suburbs and outlying townships.

Primitiva Gas Company of Buenos Ayres, Ltd.—In the report which will be submitted, with the accounts for the year ended Dec. 31 last, to the shareholders at the meeting next Tuesday (Oct. 28), the Directors express regret that the revenue was not sufficient to meet the fixed charges and expenses. The loss on the year's working was £2655, and with the debit balance brought forward there remained a debit to profit and loss account at Dec. 31, 1923, of £459,256. The scheme approved by the shareholders for the reduction and re-organization of the capital received the sanction of the High Court on May 20 last, and became operative as from that date; the preference share capital being reduced by £500,000, and the ordinary share capital by £1,160,356. In addition the preference shares have been converted into ordinary shares, and the arrears of preference dividend, amounting to £1,000,000, have been cancelled. Notwithstanding their efforts, the agreement under clause 5 of the contract with the Municipality for fixing the Company's capital has not yet been arrived at, and until the sum has been agreed no provision can be made for amortization in terms of the contract. The changes in the management in Buenos Ayres have been completed, and the Board are pleased to report a substantial improvement in business and prospects in 1924.

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The Eckington Gas Company have decided to reduce the price of gas for street lighting purposes from 5s. 4d. to 5s. 2d. per 1000 c.ft.

The Truro City Council have received a communication from the Truro Gas Company stating that, the price of gas having been reduced, the rates for public lighting under their contracts will be revised, which will mean a saving of £32.

During September, 140 new consumers of gas were added to Blackpool's list. The total increase for the six months ended Sept. 30 was 713. Over 75 million c.ft. of gas was produced at the Corporation gas-works during the four weeks ended Oct. 15—an increase of 4 million c.ft. over the corresponding period of last year, equivalent to nearly 5⅜ p.ct.

The annual meeting of Messrs. Sadler & Co., chemical manufacturers, was held at Middlesbrough on Monday—Mr. C. J. Sadler presiding. A final dividend of 4 p.ct., less income-tax (making 7 p.ct. for the year), was declared, and a balance of £14,415 was carried forward. Messrs. S. A. Sadler (Managing Director) and C. N. Sadler were re-elected Directors.

The Ellesmere Urban District Council have reduced the price of gas by 10d. per 1000 c.ft., to take effect from Oct. 1.

The Newcastle and Gateshead Gas Company had a parade of their coke express delivery wagons through the streets of the city last week, to draw the attention of the public to gas coke as a smokeless solid fuel for household and other purposes.

The Torquay Joint Advertising Committee reported to the Town Council that the Gas Committee had guaranteed ten guineas towards the Joint Advertising Fund. The Council are approaching the Gas and other Committees with a view to their contributing increased sums towards the fund on the next occasion.

The Middlesbrough Corporation are to fit a further 500 clock-work controllers to street lamps during the next twelve months. The majority of the controllers are for lamps in side streets, which are to be extinguished at 11.30 p.m. nightly, thereby effecting a saving of 15s. per annum on each lamp so fitted. The Gas Manager (Mr. C. F. Blincoe) is also to submit a scheme for high-pressure lighting in North Ormesby Road.

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Designed by Mr. H. J. HAILSTONE, of the Rochdale Corporation Gas Department.

Invaluable to GAS EXAMINERS under the Gas Regulation Act and all employed in WORKS TESTING.

(See Article in "JOURNAL," May 21, p. 523.)

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Oct. 20, 1924.

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THE Middleton Corporation invite TENDERS for RE-SETTING One Bed of INCLINED GAS RETORTS, at the Gas-Works, Townley Street, Middleton, Lancs.

Particulars may be obtained from the Engineer, at the Gas-Works.

The lowest or any Tender will not necessarily be accepted.

Sealed Tenders, endorsed "Gas Retorts," should be addressed to the undersigned, and be Delivered not later than Tuesday, the 11th of November, 1924.

J. P. WALMSLEY, Town Clerk.

Town Hall, Middleton, Lancs.

PONTYPRIDD URBAN DISTRICT COUNCIL.

(GAS DEPARTMENT.)

TO MANUFACTURERS OF STEEL MAINS.

THE above Council invite Tenders for the Supply and Delivery of STEEL MAINS and SPECIALS.

Particulars and Information may be obtained from Mr. David Muir, Engineer and Manager, Gas-Works, Treforest, Pontypridd.

Tenders, Sealed and Endorsed "Steel Mains," must be received by the undersigned on or before Tuesday, Oct. 28, 1924.

The Council do not bind themselves to accept the lowest or any Tender.

H. LEONARD PORCHER, Clerk of the Council.

Municipal Buildings, Pontypridd. Oct. 15, 1924.

CITY AND COUNTY BOROUGH OF BELFAST.

(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the Supply of:

DRY METERS (Ordinary and Prepayment), GAS COOKERS, HEATING STOVES, &c., for One or Two Years from 1st of December, 1924.

Conditions and Form of Tender may be had on Application to the Engineer and Manager, Gas-Works, Ormeau Road, Belfast.

Tenders, which must be on Official Forms, endorsed "Tender for ....., Gas Department," to be lodged in my Office not later than 5 p.m. on Thursday, Oct. 30, 1924.

The lowest or any Tender will not necessarily be accepted.

The whole or any part of a Tender may be accepted.

An Official Receipt must be obtained for every Tender delivered by hand. Tenders sent by post must be registered.

Parties tendering must comply with the Council's Standing Orders relating to Wages, Hours of Labour, &c.

R. MEYER, Town Clerk.

TENDERS invited for Crude Coal Gas TAR, delivered to Customer's Barge at our Wharf, Ponders End, Middlesex. Quantity about 32,000 Gallons per Annum.

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No Tender received after 11 a.m., Wednesday, Oct. 29.

Tenders must be on the prescribed Forms, which, with full Particulars, can be obtained from

JOHN YOUNG, Secretary.

North Street, Leatherhead. Oct. 11, 1924.